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RCRA FACILITY INVESTIGATION (RFI)
PHASE IV REPORT
CLEAN HARBORS (WICHITA) FACILITY
2549 NEW YORK AVENUE
WICHITA, KANSAS

EPA IDENTIFICATION NO KSD007246846

VOLUME 1 OF 2

Prepared by:

Cameron-Cole

5777 CENTRAL AVENUE, SUITE 20
BOULDER, COLORADO 80301

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ABBREVIATIONS AND ACRONYMS

AOC	Area of Concern
ASTM	American Society for Testing and Materials
bgs	below ground surface
BTEX	Benzene, Toluene, Ethyl Benzene, and Xylenes
cis-1,2-DCE	cis-1,2-dichloroethene
CMS	Corrective Measures Study
COC	Constituents of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CORS	Continuously Operating Reference Station
DNAPL	Dense Non-aqueous Phase Liquid
DRO	Diesel Range Organics
ft	feet
ft/ft	feet per foot
ft/yr	feet per year
GPS	Global Positioning System
GSL	Groundwater Screening Level
HHRA	Human Health Risk Assessment
HRI	Hydrocarbon Recyclers, Inc.
HS	HydraSleeve
HSWA	Hazardous and Solid Waste Amendments
HVAC	Heating, Ventilation, and Air Conditioning
IAO	Interim Action Objective
IMWP	Interim Measures Work Plan
KDHE	Kansas Department of Health and Environment
KDHERES	Kansas Department of Health and Environment-Residential
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LES	Laidlaw Environmental Services
LNAPL	Light Non-aqueous Phase Liquid
MCL	Maximum Contaminant Level
µg/kg	microgram per kilogram
mg/kg	milligram per kilogram

µg/m³	microgram per cubic meter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	Mean Sea Level
NIC	North Industrial Corridor
OA	Other Area
OVM	Organic Vapor Monitor
PAH	Polynuclear Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness and Sensitivity
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene
PDQO	Project Data Quality Objectives
PID	Photoionization Detector
pCi/l	Picocuries per liter
PPM	Parts Per Million
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSK	Risk Based Standards for Kansas
RI	Remedial Investigation
RPD	Relative Percent Difference
RSC	Reid Supply Company
RSL	Regional Screening Level
SAP	Sampling Analysis Plan
SCSC	Service Chemical Supply Company
SK	Safety-Kleen (Wichita), Inc.
SLERA	Screening Level Ecological Risk Assessment
SOP	Standard Operating Procedures
SSL	Site Screening Level
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TMB	Trimethylbenzene
TPH	Total Petroleum Hydrocarbon
TOC	Total Organic Carbon
TVOC	Total Volatile Organic Compounds
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USPCI	U.S. Pollution Control, Inc.
VC	Vinyl Chloride
VOC	Volatile Organic Compound
1,1-DCA	1,1-Dichloroethane

EXECUTIVE SUMMARY

This report presents the results of the Resource Conservation and Recovery Act (RCRA) Phase IV Facility Investigation (RFI) at the Clean Harbors Kansas, LLC facility. The facility is approximately six acres in size and located at 2549 New York Avenue, in an industrialized area of Wichita, KS. The property has been used for manufacturing and/or chemical waste handling for approximately 60 years. The facility currently operates under a RCRA permit to conduct regulated waste management activities.

During 1999, a Phase I RFI was conducted to investigate solid waste management units (SWMUs) and areas of concern (AOCs) identified in the RCRA Facility Assessment. Two supplemental RFI field investigations (Phases II and III) were performed from 2001 through 2005 to gather additional data required to fully assess whether releases to the soil and/or groundwater had occurred. The current Phase IV RFI investigation was conducted in four field events between September 2013 and February 2014. The work focused on an evaluation of the nature and extent of soil and groundwater quality impacts at specific SWMUs and AOCs identified at the facility as part of previous RFIs.

Phase IV RFI work included collection of additional lithologic data to supplement existing information describing subsurface stratigraphy. Lithology data was collected from borings placed along eight transects across the Facility and was used to generate cross-sections and refine the interpretation of the subsurface particularly in the southwestern portion of the facility where the continuity of the intermediate clay lens is not known. Lithologic data collected is consistent with historic interpretations showing the presence of five stratigraphic units. The uppermost unit is composed of clay underlain by a unit of coarse sand and gravel (referred to as the upper groundwater zone) with occasional clay lenses. The third unit is a thin clay layer (intermediate clay) underlain by an additional sand unit (referred to as the lower groundwater zone). The base of the lower sand unit is weathered bedrock (mostly clay) and the Wellington Formation. Lithology data confirms that the intermediate clay layer is not continuous in the south-southwest portion of the facility.

The Phase IV field investigation included installation of 247 borings to collect soil and groundwater data. The data was used to supplement existing hydrogeologic and hydrochemical information to further delineate soil and groundwater impacts beneath the facility. Samples were also collected to assess the potential for vapor intrusion and air quality impacts in the administrative building, and to perform an ecological risk assessment for Chisholm Creek. Soil and groundwater samples were collected from 22 SWMUs, four AOCs, and two other potential source areas.

From the 247 borings installed during the Phase IV field investigation, 892 soil samples were collected from the surface to 44 ft below ground surface (bgs). Samples were submitted for analysis of a combination of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), diesel range organics (DRO), metals, and total organic carbon (TOC). The analytical results were compared to the facility Interim Action Objectives (IAOs) presented in the Draft RCRA Interim Remedial Measure Work Plan (IMWP) for soils that was conditionally approved by the United

States Environmental Protection Agency (USEPA) on May 6, 2014. Organic constituents and metals detected above the IAO include 19 VOCs, one SVOC (aniline), and three metals (arsenic, chromium and lead).

A total of eleven VOC source areas were identified in the three regions of the facility. The three regions are identified as the following:

Western Region:	Building C, Trailer Parking Area and Southwest Fence Line Area
Central Region:	Building D and West of Building B (Former Paint Pit)
Eastern Region:	West of Building I (Former Still Area), North of Building J, Building J, South of Building J, East of Building J and Northeastern Corner

During the field investigation 136 groundwater samples were collected from 81 borings and four wells in both the upper and lower groundwater zones. Groundwater samples collected from the upper groundwater zones were analyzed for VOCs, SVOCs, DRO, radio chemistry, metals, and general chemistry. Lower zone groundwater samples were analyzed for VOC and radio chemistry only. Data from all groundwater samples were compared to the most recent (March 2014) Kansas Department of Health and Environment (KDHE) Tier 2 Risk-Based Residential Groundwater concentrations. Where data were incomplete in the KDHE Tier 2 tables, USEPA Maximum Contaminant Levels (MCL) concentration were used. Organic constituents and metals were detected above these groundwater screening levels. The constituents exceeding the groundwater screening levels in the upper zone include ten VOCs, one SVOC and six metals. DRO was detected in three groundwater samples from SWMU #11. One organic, trichloroethylene (TCE,) was detected above the screening level in samples from the lower zone.

Historical operations at the facility led KDHE to conduct a site radiological survey in 2010 using a handheld instrument to obtain surface readings of radioactivity. Results of this study suggested that the subsurface may contain radium at levels above background concentrations. In September 2013, USA Environment, L.P., was retained by Clean Harbors in 2013 to perform a radiological screening survey of the facility to evaluate and supplement data presented in the KDHE report. The radiological screening survey consisted of site wide screening with a handheld radiological detector and collection of soil samples to depths of five feet bgs. Groundwater samples for radiological analysis were also collected as part of the Phase IV RFI Investigation. Based on their preliminary investigation and a follow up Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM) Survey, USA Environmental concluded that portions of the facility that had been previously linked to low levels of radium contamination do not currently indicate significant soil concentrations that would require remediation under any state or federal guidelines for radium. The radiological survey and MARSSIM Survey were overseen and approved by KDHE. Soil and groundwater samples were collected for radium 226 and 228 analysis. Results of laboratory analysis did not indicate concentrations of radiological parameters above background concentrations.

Sediment, surface water, porewater, and macroinvertebrate samples were collected from Chisholm Creek. The data was used to perform a Screening Level Ecological Risk Assessment (SLERA) to determine the

potential for adverse effects to ecological receptors in Chisholm Creek. A limited number of compounds (arsenic, barium, lead, acenaphthene, 1,1,1-TCA) were found to be present at concentrations exceeding conservative screening criteria. Further evaluation of the distribution of these compounds relative to the results of the macroinvertebrate survey provided no evidence that the detected concentrations were related to any habitat degradation within Chisolm Creek or site related activities.

Groundwater data was collected to evaluate vertical distribution of VOC concentrations in the groundwater. The objectives of this evaluation were two-fold. Primarily the evaluation was done to identify any potential regions where contaminants were concentrated as a function of vertical conductivity. Secondarily, the evaluation was used to verify that samples collected from monitoring wells with long screens were not introducing a low bias in the data due to the well construction. The results of the evaluation do not support significant vertical contaminant distribution within the upper or lower zones. The results indicate that the sampling method used at the facility is representative of the full distribution of constituent concentrations present.

Air quality samples were collected in Building E (Administration Building) to evaluate the potential for adverse effects on the indoor air quality due to subsurface VOC contamination. Two breathing zone air samples, two sub-slab vapor samples, and one background air sample were collected and the analytical results were compared to the most recent (March 2014) KDHE Residential Indoor Air screening levels. All results were reported below the KDHE standards with the exception of the breathing zone sample collected in the basement of the building. The sample collected in the basement had a detected concentration of 1,2,4-Trimethylbenzene (TMB) of 18 micrograms/cubic meter ($\mu g/m^3$) above the standard of 7.3 $\mu g/m^3$ for this compound. This compound was not detected in either sub-slab samples or at elevated concentrations in the background sample collected outside behind Building A. Review of groundwater and soil data did not yield a source for 1,2,4-TMB within reasonable distances of Building E that would contribute to vapor intrusion. This data was further evaluated in the Human Health Risk Assessment.

1 INTRODUCTION

This report presents the results of a Phase IV Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for the Clean Harbors Kansas, LLC facility (the facility). The facility is located at 2549 New York Avenue, in an industrialized area of Wichita, KS (Figure 1). This report is being submitted in accordance with the Clean Harbors Kansas, LLC, Hazardous and Solid Waste Amendments (HSWA) Part II RCRA Permit (Permit) Section III.E.3.1 that requires the facility to "conduct additional RFI Work to characterize the nature, direction, three dimensional extent, rate of movement, and concentration of releases of hazardous waste and/or hazardous constituents from specific Solid Waste Management Units (SWMU) and/or Areas of Concern (AOCs) and their actual or potential receptors.

The Phase IV RFI was conducted in four field events between September 2013 and February 2014. The investigation focused on an evaluation of the nature and extent of soil and groundwater quality impacts at specific SWMUs and AOCs identified at the facility as part of previous RFIs. The September 2013 field event was conducted according to a RFI Phase IV Work Plan submitted to the United States Environmental Protection Agency (USEPA) Region 7 and conditionally approved on August 27, 2013. The Phase IV Work Plan identified the initial sampling activities and provided a description of investigation methodologies, standard operating procedures (SOPs), and a Quality Assurance Project Plan (QAPP) for the RFI. Subsequent field events were conducted based on the results of the September 2013 field event and were focused on delineating COC concentrations in soil to interim action objectives (IAOs) established for the facility and conditionally approved by the USEPA in May 2014.

1.1 RFI OBJECTIVES

The objectives of the Phase IV RFI are to:

- Satisfy permit conditions under Section III.E.3 of the Permit.
- Collect subsurface data required for the partial closure of Buildings B, D and J as described in the Closure Plan for Buildings B, D and J.
- Collect additional data requested by Kansas Department of Health and Environment (KDHE) and the USEPA in response to previous RFI submittals.
- Collect data to be used in evaluation of potential site remedies under the subsequent Corrective Measures Study (CMS) for the facility.

As required in Permit Condition III.E.2, this field investigation focused on data collection in the following areas:

1) Delineate the vertical and lateral extent of the soil and groundwater impacts beneath the following areas of the facility:

    A. Six SWMU's not previously investigated during previous RFI work;

1) SWMU #2 - Waste Blending and Drum Processing Area,

2) SWMU #3 - Former Drum Processing Area,

3) SWMU #10 - Drum Crusher,

4) SWMU #11 - Crushed Drum Roll-Off Boxes,

5) SWMU #13 - Drum Dock,

6) SWMU #14 - Building C Drum Storage Warehouse,

B. Eight SWMUs associated with Buildings B, D, and J proposed for closure;

1) SWMU #5 - Building D - Sparging Area,

2) SWMU #6 - Building D - Hot Rooms,

3) SWMU #7 - Building D - Elevated Tank Storage Area,

4) SWMU #8 - Building D - Regulated Waste Storage Area,

5) SWMU # 9- Building D - Solids Dryer,

6) SWMU #21 - Building D - Cyclone,

7) SWMU #15 - Building J and,

8) SWMU #16 - Building B - Corrosive Waste Storage Area.

C. Two additional AOCs identified subsequent to work completed as part of the Phase III RFI;

1) AOC #11 - Bulk Storage Tanks, and

2) AOC #12 – Area of Elevated Radium 226,

D. Subsurface soils beneath SWMU #1, #4 and #25 or provide justification to defer investigation of this area;

E. SWMU #22 - Solvent Still Area;

- Characterize vertical contaminant distribution in groundwater beneath the facility;

- Collection of data in support of a CMS for all SWMU or AOCs required under permit condition III.I through III.K

- Characterize and delineate (three dimensions) groundwater contamination emanating from the facility to support completion of the Corrective Action Environmental Indicator for Groundwater (Form CA750);

- Define the hydrogeologic interaction between groundwater contamination and Chisholm Creek to support an ecological and human health risk assessment;

- Evaluate the existing groundwater monitoring network;
- Identify and characterize any other SWMU, AOC, release or areas as necessary to evaluate source control and facility-wide corrective measure options;
- Identify potential indoor air risks associated with releases at the facility; and

1.2 REPORT ORGANIZATION

The facility setting, waste handling and regulatory history, previous facility investigations, and regional geology and hydrogeology have been described in detail in previous RFI and semi-annual groundwater monitoring reports and are not included in detail as part of this report.

This RFI report is organized to present the following information.

- Section 1: Information on the objectives of the Phase IV RFI facility and background operations and work, the SWMUs and AOCs investigated, a description of the NIC site and a facility description.
- Section 2: Summary of Previous RFI Investigations.
- Section 3: An overview of the environmental setting and site conceptual model.
- Section 4: Summary of work conducted to meet the Phase IV RFI objectives.
- Section 5: Discussion of results and source characterization.
- Section 6: Summary and Conclusions.
- Appendices A through F that provide supporting data.

1.3 FACILITY BACKGROUND AND OPERATIONS

The subject site is currently used as a 10 day storage and transfer facility for Clean Harbors, although it has historically been used for a variety of industrial purposes since the 1940s. Between the 1940's and 1979, Enmar Paint operated a paint manufacturing facility on the site. Reid Supply Company (RSC) began handling and managing hazardous waste subject to RCRA regulation on June 1, 1979. The wastes RSC handled included spent solvents, spent electroplating baths, and sludges generated off-site. The southwestern portion of the facility was referred to as the South Plant and the northeastern portion, east of 25th Street, was referred to as the North Plant. Bulk storage and solvent reclamation through settling and distillation occurred at the North Plant. Blending into fuel supplement for off-site energy recovery occurred at the South Plant. Otherwise, the waste was shipped to another RCRA facility for treatment or disposal.

Hazardous waste operations reportedly ceased at the North Plant in 1985 and RSC leased it to Service Chemical Supply Company (SCSC). During SCSC's operation, it conducted operations that involved acid

repackaging and distribution of industrial chemicals. In January 1990, SCSC moved its operations from the facility.

After 1985, ownership changed several times, but the facilities continued to be used for chemical processing and waste management activities including the recycling or processing of solvents and other wastes, and the blending of wastes for kiln fuel. Conservation Services, Inc. purchased certain assets, including the RCRA permit, from RSC in 1986. Hydrocarbon Recyclers, Inc. (HRI), a subsidiary of U.S. Pollution Control, Inc. (USPCI), acquired Conservation Services, Inc. in 1988. USPCI was owned by Union Pacific Corporation from 1988 through 1994. Laidlaw Environmental Services (LES) purchased USPCI in 1995; LES changed the name to Safety-Kleen (SK) Inc. after acquiring SK in 1998. Effective September 7, 2002, Clean Harbors, Inc. purchased from Safety-Kleen Services, Inc. certain assets of the Chemical Services Division of Safety-Kleen Corporation. As a result of the sale, Clean Harbors Kansas, LLC is, as of September 7, 2002, the owner of the regulatory permits and operator of the equipment and assets located at the facility, which were formerly owned and operated by Safety-Kleen (Wichita), Inc.

The facility was first permitted as a hazardous waste management facility operating under a RCRA Part I operating permit (EPA Identification Number KSD007246846) initially issued by KDHE on April 7, 1995 and most recently renewed on September 28, 2012. Wastes historically handled at the facility include paints (and related wastes), batteries, fluorescent lights, incinerable hazardous solids, lab packs, mercury, household hazardous wastes, off-specification and production wastes from industries, both chlorinated and non-chlorinated petroleum-based waste solvents, plating wastes, and corrosives.

The facility currently operates under a RCRA permit to conduct regulated waste management activities that include the storage, treatment, and recovery for recycling of hazardous and non-hazardous wastes and otherwise manages RCRA hazardous and nonhazardous wastes, sludges, solids and liquids for shipment to other facilities for treatment, reuse, or disposal. Hazardous waste management at the facility includes fuel blending for energy recovery, neutralization, accumulation of materials for reclamation, accumulation for hazardous waste landfill disposal, repackaging for incineration, and storage of industrial waste waters for subsequent discharge.

Storage of materials at the facility occurs in containers (generally drums). The facility currently has five active permitted storage areas (Building C, Building I, the Processing Area, the Drum Dock and Building J), and eight permitted tanks previously used for storage and treatment. All storage tanks, the Process Area and Building C are or soon will be undergoing closure.

Wastes are received at the facility in drums and in bulk by tanker trucks. The drummed waste is managed in Building C. The bulk liquid waste from tanker trucks is offloaded to tanks at a truck bay located along the south end of the Processing Area. Building I is also permitted for waste handling in three container management units. The facility layout with designated SWMUs and AOCs identified is presented as Figure 2.

1.4 NORTH INDUSTRIAL CORRIDOR (NIC) SITE

The facility is located within a large industrial area referred to as the North Industrial Corridor, or "NIC" (Figure 3). The NIC is located in north-central Wichita and is comprised of over 4,000 acres of commercial, industrial, residential, agricultural, and recreational property. The NIC consists of at least one former Comprehensive Environmental Response , Compensation, and Liability Act (CERCLA) (i.e., Superfund) site (29th and Mead) that was combined with two other identified sites (the Northeast Investigation Area and the 13th and Washington Site), delisted, and turned over to the City of Wichita to be managed with KDHE and USEPA oversight. Data collected during the Phase IV RFI field investigation may also be used for further assessment of NIC contamination.

2 PREVIOUS INVESTIGATIONS

The Phase IV RFI work supplements field activities initiated with the Phase I RFI conducted in 1999, Phase II RFI conducted in 2001, and Phase III RFI performed during the period of August 2002 through January 2005. These RFI investigations have been described in detail in previous RFI reports and a chronological summary of each event is presented in Table 1. Table 2 presents a summary of historical samples collected and the analysis performed. Soil borings and well locations are shown in Figure 4. The previous investigations are summarized briefly below.

2.1 RFI PHASE I

The Phase I RFI field work was initiated in November and December 1999 and completed in April 2001. The primary objective of the Phase I RFI was to investigate SWMUs and AOCs identified in the RCRA Facility Assessment to assess whether releases occurred into the subsurface soil and/or groundwater. The work included installation of 44 soil borings (B-1 through B-44) with soil sampling generally limited to three feet below ground surface (ft. bgs). Five exploratory direct-push borings (EB-1 through EB-5) were advanced and logged with electric conductivity technology. Discrete groundwater grab samples were also collected at three different depths within each boring for VOC analysis.

A total of 10 groundwater monitoring wells were installed. Six wells were installed in the upper zone of the alluvial aquifer (SK-1S through SK-6S) and four lower zone wells (SK-1D, SK-2D, SK-3D and SK-5D) were installed.

Five surface water samples were collected from the East Fork of Chisholm Creek and analyzed for VOCs.

In the Phase I RFI, samples from each boring were analyzed for a combination of the following parameters: pH; the RCRA metals; semi-volatile organic compounds (SVOCs); total petroleum hydrocarbons (TPH); pesticides; polycyclic aromatic hydrocarbons (PAHs); benzene; toluene; ethyl benzene; xylenes (BTEX); and VOCs. Analysis of pesticides, PAHs, BTEX and TPH were performed only in areas possibly impacted by such chemicals based on available site information as specified in the Phase I Work Plan. Because many of these constituents were not present in Phase I samples, subsequent RFI phases focused on VOCs, SVOCs and metals.

2.2 RFI PHASE II

The Phase II RFI was conducted during November 2001, when 39 additional direct-push borings (B-45 through B-83) were advanced to further assess the extent of soil impacts south of Building C near the loading ramp in SWMU #24; south of the processing area (SWMUs 1 and 4); south of the former paint can burial pit (SWMU #20); east of Buildings J and K (SWMUs #15, #23 and Area of Concern (AOC #6)); and, between Buildings I (AOC #3) and J (SWMU #15) along the rail spur.

From the 39 borings, a total of 55 soil samples were collected and analyzed for VOCs and 34 samples were analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Four

additional monitor wells were installed. Two off-site shallow wells (SK-10S and SK-11S), one on-site shallow well (SK-B68), and one on-site deep well (SK-4D).

A second round of surface water samples were collected at the same location as the five samples collected during the Phase I investigation.

2.3 RFI PHASE III

The Phase III RFI was conducted during the period of August 2002 through January 2005. The Phase III RFI included installation of 30 borings to assess the lateral extent of VOCs detected in soil during previous RFI phases. The borings were advanced south of Building C (SWMU #24), the vicinity of the dry solids gondola (SWMU #17), the open area along the southwest corner of the subject property (SWMU #18), in the northeastern corner of the facility (Other Area (OA) #6/AOC #10), outside of the eastern fence, south of Building J (SWMU #15), and north of Building A. Soil and groundwater samples were collected from select borings. One additional shallow well (SK-B92), was installed to evaluate groundwater quality in the area south of Building C (SWMU # 24).

During October 2003 soil borings B-87, B-88, B-89, B-107, B-108, and B-109 were installed on the south side of the facility to further define the extent of constituents detected in B-76 which is adjacent to the southern property boundary in SWMU #18. Groundwater samples were also collected from five of the six sample locations.

During October 2004, three deep monitoring wells (SK-7D, SK-8D, and SK-9D) and one shallow well (SK-8S) were installed to further assess groundwater quality upgradient of the facility. In January 2005, additional soil borings were advanced in the vicinity of Building J (SWMU #15), in the northwest corner of the facility (OA #6/AOC #10), and south of Building C (SWMU 24).

3 ENVIRONMENTAL SETTING

The following sections provide a brief summary of the site conceptual model as it relates to the facility hydrogeology, the constituents of concern detected in soil and groundwater. Section 4 of the 2006 RFI Report provides detailed descriptions of the climate, physiography, and vicinity land use. The information remains relatively unchanged and is not discussed further in this report. New data has been collected as part of the Phase IV RFI to further refine the interpretations of the subsurface geology, hydrogeology, and surface water hydrology.

The hydrogeologic and chemical data collected at the facility has been used to develop a site conceptual model. This conceptual model provides a framework for understanding how the subsurface impacts resulting from facility operations originated and evolved through time. Subsurface data collected during previous facility investigations have been used to generate cross-sections of the subsurface under the facility.

Hydrogeologic Cross-Section A-A' through C-C' were generated using data from RFI Phases I through III as shown on Figure 5. These cross sections illustrate the principal hydrogeologic units and features beneath the facility. Previous investigations have identified five stratigraphic units that comprise the shallow subsurface beneath the facility. Areas of fill at the surface are underlain by an upper unit of clay that extends from beneath the fill to approximately 15 feet (ft) below ground surface (bgs) at the deepest point. This upper clay unit is underlain by approximately nine to 17 ft of fine to coarse sand and gravel (referred to as the upper zone) with occasional clay lenses. Below this sand lies another thin clay layer, approximately two to six ft thick. The intermediate clay is underlain by an additional eight to nine ft of sand (referred to as the lower zone). The base of the lower sand unit is underlain by one to nine ft of weathered bedrock (mostly clay) and the Wellington Formation (bedrock) that is approximately 200 ft thick in the vicinity of the facility (PRC, 1990).

The Phase IV RFI included collection of additional lithologic data to supplement existing data associated with subsurface stratigraphy. Lithology data was collected from borings placed along eight transects across the Facility and was used to refine the interpretation of the subsurface particularly in the southwestern portion of the facility where the continuity of the intermediate clay lens is not known. Boring Logs are presented in Appendix A.

Five cross-sections (Figures 6-10) were generated using historic lithologic data along with Phase IV RFI data. The Phase IV RFI data is consistent with historic interpretations identifying the presence of the five distinct layers discussed above. Cross-Section C-C' which is anchored in the southwestern corner of the facility shows that the intermediate clay layer is not continuous in the south-southwest portion of the facility. A deep boring (S18-2D) placed southwest of SWMU #17 (Dry Solids Gondola Area) shows the presence of the clay; however, the deep boring (S18-5D), advanced on the south-southwest edge of the facility property approximately 150 feet south of S18-2D, lacked the intermediate clay lens.

3.1 SITE HYDROGEOLOGY

The groundwater flow system under the Facility consists of an upper shallow sand unit (upper zone), an intermediate thin clay unit, a deeper sand unit (lower zone), and an underlying low-permeability weathered bedrock unit.

Historic lithologic data along with 14 samples collected for soil classification during the Phase IV RFI indicate that the upper and deeper sand layers are both water bearing units comprised of relatively uniform sands. The less permeable unit between is a thin layer of clay varying in thickness from approximately 2 to 6 feet. The underlying bedrock formation has low permeability and does not constitute an important aquifer in the area. The depth to bedrock in the area is approximately 39 ft bgs.

Natural groundwater flow beneath the facility is southeast towards Chisholm Creek. There are no surface water features such as lakes, rivers, or retention ponds that would provide localized infiltration and recharge to groundwater with the exception of Chisholm Creek.

3.1.1 Upper Zone

The depth to groundwater under the facility is typically 13 to 17 ft bgs but can vary a foot or more in response to precipitation events. Groundwater occurs in the upper zone under water table conditions. The saturated portion of the upper zone, which is approximately 10 ft thick, is underlain by a clay layer that functions as a shallow, semi-confining aquitard at the base of the upper zone. The direction of groundwater flow in the upper zone in is to the southeast. Figure 11 illustrates the groundwater potentiometric surface from October 2013 for the upper zone. The horizontal hydraulic gradient for the upper zone is approximately 0.0045 feet per foot (ft/ft) across the facility and becomes steeper near Chisholm Creek.

Groundwater elevations are included on Figure 7, Cross-Section B-B', which intersects Chisholm Creek. A comparison of surface water elevations to groundwater potentiometric surface maps suggests that groundwater in the upper zone is hydraulically connected to the East Fork of Chisholm Creek and that the creek is a discharge point for the shallow groundwater beneath the facility.

3.1.2 Lower Zone

Groundwater occurs in the lower zone under semi-confined conditions across most of the facility. These conditions are a result of an overlying two to six foot-thick clay layer. This clay layer may retard downward migration of shallow groundwater and associated dissolved constituents to the lower zone. The weathered bedrock and shale bedrock at the base of the lower zone provide a barrier to downward migration of groundwater. Figure 12 illustrates the groundwater potentiometric surface from October 2013 for the lower zone.

3.2 SURFACE WATER HYDROLOGY

During 2013 the facility installed several improvements that included the addition of gutters and downspouts on Building C, installation of sump pumps, and grading of areas on the north side of the facility to form berms and slopes that will minimize precipitation ingress from larger intensity storm events. There is one

main stormwater discharge pipe that runs east-west through the center of the facility to convey stormwater from the facility to the discharge point at Chisholm Creek approximately 150 ft east. There are several drains located along the pipe to collect stormwater as it drains from the facility. Precipitation that is not conveyed by the stormwater system flows overland in various directions based on facility grading.

The East Fork of Chisholm Creek is the closest surface water body to the facility and is located approximately 150 ft east of the property boundary (Figure 4). This stream discharges to the Arkansas River approximately three miles south of the facility. The East Fork of Chisholm Creek is concrete lined in places, but near the facility it is unlined. The Northern Industrial Corridor Remedial Investigation (NIC RI) (CDM, 2002) indicated that the creek is a gaining stream. This is consistent with the water table map as shown on Cross-section B-B' (Figure 7).

3.3 SITE CONCEPTUAL MODEL

The constituents of concern (COC) released from the facility into the soil and groundwater underlying the facility, have resulted in subsurface impacts in the form of soil, soil vapor, and dissolved phase groundwater and surface water contamination. The borings and wells used to develop the site conceptual model are shown on Figure 4.

3.3.1 Site Soil Conceptual Model

The releases of COCs onto soil at the facility have resulted in subsurface impacts to soil and groundwater. The analytical results indicate that locations inside the facility contain detectable concentrations of COCs (primarily VOCs with some SVOCs and metals). The cross-sections presented in Figures 5 through 10 illustrate the soil stratigraphy beneath the facility. The COCs present in unsaturated zone soils potentially provide a source of contamination to groundwater beneath the facility.

The capillary fringe zone above the water table interface represents a smear zone where residual COCs have been spread over several vertical feet by seasonal fluctuations of the groundwater table. There is no indication of pooled or persistent residual DNAPL at the facility, as the chlorinated VOC concentrations decrease significantly with depth both within the upper zone and between the upper and lower zones. DNAPL has not been observed or measured as a distinct separate phase in any of the monitoring wells, and there are currently no dissolved-phase VOC concentrations that approach 1% of their respective solubilities, which is a generally accepted industry criterion for suggesting a potential for the presence of residual phase DNAPL.

The analytical results collected to date show that locations inside the facility contain detectable concentrations of COCs in the unsaturated zone from facility releases. The concentrations of select COCs exceed IAO screening levels identified in the Draft Interim Measures Work Plan (IMWP).

The COCs adsorbed to soil in the unsaturated zone potentially act as potential sources of soil vapor and groundwater contamination at the facility. The Soil Interim Measure using excavation described in the Draft IMWP is designed to remove soil COC concentrations to levels below the IAOs and eliminate, to the extent possible, these residual sources.

3.3.2 Site Groundwater Flow Conceptual Model

The groundwater flow system consists of an upper shallow sand unit (upper zone), a laterally discontinuous clay aquitard, and an underlying deeper sand unit (lower zone) that is positioned on top of an extensive shale bedrock unit (Wellington Shale). Hydrogeologic Cross-Section A-A' shown in Figure 6 illustrates the principal hydrogeologic units at the facility and the water table surface in the upper zone based on the Phase IV RFI completed in September-October 2013.

Figures 11 and 12 present the natural groundwater potentiometric surface of the upper and lower zones, respectively, of the sand aquifer overlying the weathered bedrock. Groundwater flow is to the southeast in both the upper and lower aquifer zones toward the East Fork of Chisholm Creek. The horizontal hydraulic gradient for the upper zone of the shallow aquifer is approximately 0.0045 ft/ft across the facility. The hydraulic gradient near the creek is steeper (0.0084 ft/ft) as measured between SK-10S and SK-SW-3. The horizontal gradient calculated in the lower zone is approximately 0.002 ft/ft.

Upward gradients are typically observed in the majority of well pairs indicating that the potentiometric surface in the lower zone is generally higher than the potentiometric surface in the upper zone. The clay layer separating the upper and lower zones likely acts as an aquitard within the alluvial aquifer that can impede the downward migration of groundwater and dissolved constituents to the lower zone of the aquifer. However, in the southwestern portion of the facility, the aquitard is absent and the upper and lower zones form a single permeable sand unit.

Stresses to the regional groundwater flow system include regional groundwater pumping from remediation and water-supply wells, aerial recharge from precipitation, stormwater retention, and groundwater discharge to Chisholm Creek in the upper zone. The regional groundwater potentiometric surface in the Wichita area contains localized areas of drawdown around remediation and production wells. However, the ground water surface at the site does not appear to be influenced by any regional groundwater pumping.

3.3.3 Dissolved COC Transport Conceptualization

Groundwater COC concentrations are present beneath the facility due to a combination of regional and site-related sources. The facility lies within the NIC, which has been identified as having a dissolved groundwater plume of chlorinated VOCs. Observed groundwater concentrations of VOCs on the eastern portion of the facility appear to be the result primarily from source areas located upgradient of the facility. Observed dissolved-phase concentrations on the central and western portion are similar to upgradient concentrations and also appear to be connected to the regional groundwater plume. Sorbed VOCs both upgradient of the facility and within the facility boundaries continue to provide the source for the VOC plume.

The transport of COCs is by advective-dispersive flow, with diffusion playing a negligible role in the transport process. Groundwater flow velocities for the upper and lower zones are moderately high for unconsolidated porous media at approximately 435 feet per year (ft/yr). At these flow velocities, advection and dispersion are the dominant transport processes acting on the porous media. Diffusion may play a role

in the transport of the COCs in the fine-grained silt and clay that separates the upper and lower zones in the eastern portion of the site.

The laterally extensive clay aquitard, present over the majority of the facility with the exception of the southwestern portion of the facility, significantly attenuates the concentrations of COCs between the upper and lower zones as evidenced by the fact that the concentrations in the deeper lower zone are generally two to five times lower than the concentrations in the upper zone. This decrease in concentration across this fine-grained interface is a direct consequence of the increased sorption, slower vertical transport, and natural degradation across the fine-grained aquitard.

4 PHASE IV RFI

This section provides a description of Phase IV RFI field activities and results of analytical testing conducted from September 30, 2013, through February 12, 2014, at the facility. The following sections briefly describe the field sampling methods employed during the field investigation. The RFI field and analytical results are described in detail in Section 5.

4.1 RFI DATA ACQUISITION

The Phase IV RFI sampling program was designed to address all the items required by the Facility Permit and the RFI Work Plan, and includes the following:

- Installation of 247 borings using direct push technology to collect soil samples, determine lithology, and collect groundwater samples.
- Collection of soil samples for analysis of VOCs and SVOCs, pesticides, herbicides, polychlorinated biphenlys (PCBs), total petroleum hydrocarbons as diesel range organics (DRO), total organic carbon (TOC), radium, metals, and general chemistry at select locations and depths.
- Collection of groundwater samples for analysis of VOCs, SVOCs, DRO, radium, metals, and general chemistry at select locations and depths.
- Collection of sediment, porewater, surface water, and aquatic detritus samples to support an ecological risk assessment.
- Collection of ambient air and sub-slab air samples for analysis of VOCs to determine the potential for vapor intrusion; and
- Boring decommissioning in accordance with KDHE regulations.

Below is a general summary of the approach that was used for each investigative activity performed as part of the Phase IV RFI.

4.1.1 Installation of Soil Borings

Soil borings were completed in accordance with the conditionally approved Phase IV RFI Work Plan and Sampling and Analysis Plan (SAP). Prior to any subsurface investigation, a facility-wide utility clearance was conducted to minimize the potential of contacting subsurface utilities. However, a proprietary utility line was encountered under the concrete slab within Building D. The building was subsequently de-energized and work was able to proceed.

246 soil borings were drilled using a Geoprobe® direct-push rig. The total depth of the soil borings ranged from 5 ft bgs to 44 ft bgs. A lithologic log was prepared for each boring advanced to a depth greater than five ft bgs during field activities completed in October 2013. Borings completed during subsequent field events performed during the period from December 2013 through February 2014 were not logged as their

locations were generally adjacent to existing borings that had previously been logged. Soil cores were evaluated for any changes in subsurface lithology compared to the adjacent soil borings. All soil borings were drilled under the technical supervision of a geologist or engineer.

Boring depths ranged from 10 to 25 ft bgs in the upper zone to 44 ft bgs in the lower zone. This target depth was selected to allow for collection of samples to the bottom of the upper zone and to ensure sufficient water volume for groundwater sampling. Continuous soil cores were collected using polyvinylchloride (PVC) liners from the ground surface to the total depth of the boring.

The depths where soil and groundwater samples were collected were documented in the field logs. For all borings requiring a lithologic log (those with depths that are > five ft) the soil cores were removed from the liner and evaluated in the field to document soil color, moisture content, odor, and lithology in accordance with the Unified Soil Classification System (USCS).

All soil samples were screened in the field for VOCs using an organic vapor meter (OVM) equipped with a photoionization detector (PID). In accordance with the procedures described in the approved Sampling and Analysis Plan (SAP), both direct and headspace field screening using a zip lock bag were performed on all soil samples and results recorded on field logs. Although the OVM readings cannot be used to directly quantify VOC concentrations or identify individual compounds, samples with OVM readings greater than 20 parts per million (ppm) were used as indicators of potential soil contamination. This value was used to qualitatively determine if extending the boring to a greater depth to collect additional samples was warranted to fully delineate the vertical extent of impacts. In addition, any sample that exceeded an OVM reading of 20 ppm was submitted for laboratory analysis of VOCs. If the 20 ppm value was observed in the sample collected from the bottom of the boring, the depth of the boring was advanced an additional five ft and OVM readings collected and re-evaluated. For borings proposed to extend to a depth not greater than five ft, soils samples were collected from a depth of two ft bgs and submitted for laboratory analysis. Samples were also collected from a depth of five ft bgs but were held pending results of laboratory analysis on the sample collected from the two ft bgs. interval. Analysis of the sample collected from five ft bgs was completed only if VOC's were detected in the sample collected at two ft bgs.

4.1.2 Soil

A total of 892 soil samples (including 60 split and mobile lab replicate samples) were collected at varying depths from the 247 borings and submitted for analysis in accordance with the methods specified in Table 4 of the Phase IV RFI Work plan. All soil samples for VOC analysis were collected using Terra Core® samplers and placed into the sample containers as soon as practicable after collection. The samplers were pre-tared and provided by the laboratory to collect the appropriate soil volume for analysis. For each sample the laboratory provided three vials; one preserved with methanol (for high level analysis) and two with de-ionized water, a stir bar and bisulfate (for low level analysis). Additionally, a jar of soil was collected and used by the laboratory to determine the dry weight of the soil that is used to determine the final VOC concentrations by normalizing the results to the dry weight. Samples for all other parameters were collected using a decontaminated trowel and scooping the soil into the laboratory supplied container. October 2013 samples were submitted to Accutest Laboratories for analysis as described in the RFI Work

plan. Sample locations are shown on Figure 4. Samples collected during the December 2013, and January and February 2014 events were either analyzed by an on-site mobile lab (Environmental Priority Service, Salina Kansas) or sent to PACE Analytical in Kansas City and analyzed for their standard list of VOCs by method 8260B.

4.1.3 Sediment Sampling

Eleven sediment samples were collected from the East Fork of Chisholm Creek. Sediment samples were collected using methods consistent *with Field Sampling Guidance Document #1215 – Sediment Sampling* (USEPA, 1999). Sampling points were spaced at intervals between 100 and 250 ft, due to variability in stream bed accessibility and the amount of available sediment at any given location. Figure 4 shows the eleven sample locations. Samples were collected from beneath the water surface using a stainless steel trowel. This trowel was decontaminated between sample locations in order to prevent cross contamination. Samples were submitted to Accutest Laboratories for analysis of VOCs, SVOCs, metals, and TOC.

4.1.4 Porewater Sampling

Eleven porewater samples were collected from the East Fork of Chisholm Creek adjacent to sediment sampling locations (Figure 4). Samples were collected in accordance with the operating procedure published on February 28, 2013 by the USEPA Region 4, Science and Ecosystem support Division for Pore Water Sampling. Samples were collected at approximately six-inches beneath the water surface using a 36-inch push point sampler, equipped with a disposable ¼-inch syringe adaptor, and plastic sheeting at least one-foot in diameter to minimize surface water infiltration. Sampling points were chosen to closely match sediment sampling points, so that each pore water sampling point was no more than a few feet from the area which sediment was collected. The push point sampler was decontaminated in accordance with the SAP in between sampling locations, and a new syringe adaptor was used for each sample. Samples were submitted to Accutest Laboratories for analysis of VOCs, and toxaphene.

4.1.5 Aquatic Detritus Sampling

To assess the aquatic invertebrate community of Chisholm Creek, four downgradient and one upgradient macroinvertebrate samples were collected by RBR on October 3, 2013. Sample locations are identified on Figure 4. The samples were shipped to and analyzed by Normandeau Associates Inc. A complete description of the sampling protocol, locations, and results are provided in the Screening Level Ecological Risk Assessment Report provided in Appendix F.

4.1.6 Groundwater Sampling

A total of 136 groundwater samples were collected from 81 borings and four wells (SK-1S, SK-2S, SK-12S, and MW-18) during the investigation. All groundwater samples were collected using the procedures described in the approved Phase IV RFI Work Plan.

Groundwater samples, collected from temporary borings were collected using a screen sampler installed at the end of the direct push drilling rod. The length of the screen exposed to the formation was initially set at one foot and slowly increased at the discretion of the geologist based on the lithology encountered. The

maximum length of screen exposed did not exceed two ft, with the exception of 11 samples where the screened interval was set at three ft to allow for sufficient groundwater infiltration to collect the sample. These 11 borings were: S1-2, DC-Sump, A12-10, S17-1a, JC-7, JC-5a, JC-9, JC-1, JC-11, S18-1, and S17-1. The sampling tube intakes were set approximately in the middle of the screened interval resulting in collection of groundwater from one to three ft below the water table.

The groundwater samples were collected using disposable polyethylene tubing and low-flow purging/sampling technique in accordance with the SAP. There were 15 occasions where the borings were initially dry. In these instances, the borings were left open to recharge. Nonetheless, sufficient water to fill the flow-through cell and collect the required purge data used to determine stabilization was not available. Therefore, in the borings with insufficient groundwater recharge, the sample vials were filled using a sampling tube and check-valve apparatus. Samples collected this way are noted on the field data sheets. Groundwater samples collected in the field were placed in laboratory supplied containers, labeled, recorded on the chain-of-custody and submitted to the analytical laboratory for testing.

To further define the vertical distribution of contaminants in groundwater, three on-site monitoring wells were sampled using HydraSleeve™ (HS) groundwater samplers. The HS samplers were used to collect representative samples from discreet depth intervals within a single well. Additionally, groundwater samples were collected from the same depth intervals using direct push borings drilled directly adjacent to each well. To prevent cross-contamination a new boring was drilled for each discreet sampling interval. A groundwater sample was also collected from the monitor well using the low flow purge technique, with the sample tube set to two ft below the groundwater table. Data from all three sample collection methods along with historical data from samples collected during routine semi-annual events was used to evaluate vertical contaminant distribution in groundwater. Data from all groundwater samples were compared to the most recent (March 2014) KDHE Tier 2 Residential Groundwater values. Where data was incomplete in the KDHE Tier 2 tables, USEPA Maximum Contaminant Levels (MCL) concentration were used.

4.1.7 Boring Decommissioning, Surveying and Groundwater Elevation Survey

Upon completion of sampling, all borings were decommissioned in accordance with KDHE requirements and procedures specified in the Phase IV RFI Work Plan. The locations of all soil borings were surveyed by a state-registered and licensed professional land surveyor. Horizontal coordinates were derived from the City of Wichita Continuously Operating Reference Station (CORS) Global Positioning System (GPS) Spider Network. Elevations were determined relative to the facility benchmark.

4.1.8 Equipment Decontamination

All non-dedicated sampling equipment was decontaminated between sampling locations in accordance with the approved RFI Work plan. Decontamination wastewater and sample purge water, soil sample sleeves, groundwater tubing and other disposable sampling equipment was containerized and properly disposed of as prescribed by the approved RFI Work plan.

4.1.9 Air Sampling

A total of four air samples were collected from within Building E to evaluate the potential for vapor intrusion. Of the four samples collected within the building, two were collected in the breathing space in clean and certified Summa Canisters over an eight-hour period to represent typical exposure times in an industrial setting. The other two were collected as sub-slab vapor samples. All samples were submitted to an analytical laboratory for analysis of VOCs using EPA Method TO-15 (low level) and the results compared to the KDHE Risk Based Standards for Kansas (RSK) Manual, 5th Version and USEPA Regional Screening Levels.

4.2 LABORATORY ANALYSES

Testing was conducted in accordance with current test methods, identified in Table 1 of the QAPP located in Appendix C of the RFI Work Plan. Table 3 provides a summary of all samples collected during the Phase IV RFI and the analysis requested.

Samples collected during December 2013, January 2014 and February 2014 were analyzed using either an on-site mobile lab (Environmental Priority Service (EPS), Salina Kansas) or PACE Analytical in Lenexa Kansas. Neither of these laboratories was specified in the approved QAPP. These local laboratories were used to facilitate rapid characterization of soil source area boundaries. PACE Analytical is certified by the State of Kansas to perform the metals and VOC analyses. Samples analyzed by EPS yielded estimated concentrations of PCE, TCE, cis-1,2-DCE and the BTEX compounds. EPS is not a Kansas certified laboratory and the data generated by the on-site mobile lab was not used in the risk assessment nor will it be used to certify attainment of IAOs during execution of the IRM.

4.2.1 Geotechnical Testing

Fourteen soil samples were collected for geotechnical analysis to support evaluation of site remedies and potential future contaminant fate and transport modeling. Three samples were collected from the uppermost clay unit at approximately five-ft bgs. Eight samples were collected from the upper sand unit from 15 to 25 ft bgs, one sample was collected below the clay in the upper sand unit at a depth of five bgs. One sample was collected from the intermediate clay unit and one sample was collected from the lower sand unit for geotechnical analysis.

All samples were submitted for geotechnical tests that included hydraulic conductivity, soil classification, wet and dry bulk density, moisture content, specific gravity, and total porosity. Due to laboratory error, hydraulic conductivity analysis was not performed with the exception of five samples that were analyzed for intrinsic permeability. The remaining samples were incorrectly analyzed for electrical conductivity. All other analysis was completed as requested.

Analyses were performed using appropriate American Society for Testing and Materials (ASTM) or other documented procedures by a laboratory experienced in soil analyses. The specific method was determined at the time of analysis and depended on the soil type.

4.3 DATA QUALITY SUMMARY

Cameron-Cole collected 892 soil (including 60 split and mobile lab replicate samples), 136 groundwater, 11 sediment, five aquatic detritus, 11 porewater, five surface water, and five air samples between October 2013 and February 2014. With the exception of the mobile lab replicate samples, all other soil, sediment, air, groundwater, surface water, and porewater samples were submitted for analysis to either Accutest Laboratory in Orlando, Florida, or Pace Analytical in Kansas City, Kansas, both Kansas-certified laboratories. Aquatic detritus samples were submitted to Normandeau Associates. The geotechnical samples were submitted to Accutest Laboratories, but subcontracted out to Golder Associates for analysis. All radiological samples were submitted to Accutest Laboratories, but subcontracted out to Summit Environmental Laboratory for analysis. Analytical results of all data are presented in data summary tables in Appendix B. Laboratory analytical reports are also provided on a CD in Appendix C.

Data validation was performed to assess compliance with the project data quality objectives (PDQOs) of all sample results. The analytical data generated during the RFI were evaluated against applicable quality assurance and quality control (QA/QC) requirements and guidelines described in USEPA's Contract Laboratory Program National Functional Guidelines for Organic Data Review (September 1998); and USEPA's Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1999) (National Functional Guidelines). Field and laboratory analytical QA/QC was also evaluated based on the requirements outlined in the approved project QAPP.

Analytical data were evaluated in terms of the following QA/QC elements: holding time compliance, field and laboratory blank analyses, surrogate recoveries (organics), laboratory control sample (LCS) and LCS duplicate (LCSD) recoveries, matrix spike (MS) and MS duplicate (MS/MSD) recoveries, field duplicate precision, and results quantitation. Data validation summaries prepared for each analytical report are provided on a CD in Appendix D. These QA/QC elements were evaluated and quantified in terms of the PDQOs often referred to as the PARCCS parameters (precision, accuracy, representativeness, comparability, completeness, and sensitivity). The following subsections discuss an overview of the findings of the QA/QC program.

4.3.1 Soil Data Quality

Data quality of soil sample analyses were evaluated in terms of the project PDQOs. Data that did not meet PDQOs has been flagged with data validation qualifiers. Laboratory QA/QC data indicated that the LCS spike recovery was low and outside quality control limits for several groups of samples. These data were qualified as "R Rejected". Detections of constituents for samples that were properly preserved, but the analysis was performed outside the technical hold time were qualified as "J Estimated". Non-detected results of these samples were qualified with a "UJ Estimated Non-Detect".

All data collected and reported using mobile laboratory analyses are qualified as "J Estimated" if detected and "UJ Estimated Non-Detect" if there were no detections. Mobile lab data were not used in the risk assessment and will not be used to certify attainment of IAOs during execution of the IRM.

The relative percent difference (RPD) calculations are not presented for the soil split samples due to the difficulty in obtaining truly homogenous samples. However, the calculated data was used as a qualitative evaluation for determining compliance with PQDOs. There were no resulting validation flags applied to the data as a result of this evaluation.

4.3.2 Groundwater and Surface Sample Data Quality

Data quality of groundwater and surface water sample analyses met project QA/QC requirements, with the following exceptions. Laboratory QA/QC data indicated that the LCS recovery was low and outside quality control limits. These data were qualified as "R Rejected". Detections of constituents for samples that were properly preserved, but the analysis performed outside of the technical hold time, there was headspace noted in the vials, or there was poor precision between the primary and duplicate samples a qualification flag of "J Estimated" was placed on the data. Non-detected results of these samples were qualified with a "UJ, Estimated Non-Detect".

RPDs were calculated between primary and duplicate groundwater samples. Results with RPDs greater than 40 percent were qualified as "J/estimated". The summary tables and figures include data qualifiers and the results for duplicate samples, where collected. The interpretation of groundwater quality conditions in this RFI report incorporates the use of both sample and duplicate sample results unless otherwise noted.

4.4 Phase IV Investigation Areas

The following sections present the details on data collected during the Phase IV RFI field investigation. Each section discusses the field investigation and data collected to satisfy the Facility Permit Conditions and the requirements of the RFI Work Plan.

4.4.1 Investigation of Six SWMUs Deferred During Previous RFI Investigations

Subsurface investigation of SWMUs #2, #3, #10, #11, #13 and #14 were performed to identify any impacts to soil and groundwater where investigation work was previously deferred due to active facility operations. Five of these SWMUs (SWMU #2, SWMU #3, SWMU #10, SWMU #13 and SWMU #14) had not been previously investigated; therefore, all samples from these five SWMU's were submitted for analysis of VOCs, SVOCs and metals. In addition, two soil samples and one groundwater sample for analysis of DRO were collected from one soil boring within SWMU #10. As part of previous RFI investigations, soil and groundwater samples were collected from SWMU #11. Based on the results of previous RFI investigations, samples collected from SWMU #11 were analyzed for metals and VOCs only. A description of each SWMU and the samples collected is provided below.

4.4.1.1 SWMU #2 - Waste Blending and Drum Processing Area

The waste blending and drum processing area is located between Buildings C and D and adjacent to and north of SMWU #1, Process Area Storage Tanks. The materials handled in this area included various hazardous wastes such as non-chlorinated petroleum based solvents, chlorinated solvents, and waste fuel. During the Phase I RFI field investigation in December 1999 a sample was collected from boring B-16 located north of SWMU #1. This sample was collected from the one to three ft interval and analyzed for metals and

VOCs. Trichloroethylene (TCE) and lead were detected in the sample. Due to the handling of waste fuel in this area, in addition to VOCs, SVOCs and metals, samples collected were analyzed for DRO. Soil samples were collected from two soil borings (S2-1 and S2-2) and a groundwater sample was collected from the upper zone in soil boring S2-1. Samples were submitted for laboratory analysis as shown on Table 3.

4.4.1.2 SWMU #3 - Former Drum Processing Area

The Former Drum Processing Area is located between Buildings C and D and adjacent to SMWU #2, and the Process Area Storage Tanks (SWMU #1). The materials handled in this area include various hazardous wastes such as non-chlorinated petroleum based solvents, chlorinated solvents, and waste fuel. No previous investigations have been conducted in this area. Due to the handling of waste fuel in this area, in addition to VOCs, SVOCs and metals, select samples collected were also analyzed for DRO. Soil samples were collected from two soil borings (S3-1 and S3-2) and a groundwater sample was collected from the upper zone in soil boring S3-1. Samples were submitted for laboratory analysis as shown on Table 3.

4.4.1.3 SWMU #10 – Drum Crusher

No previous investigations specific to SWMU #10 have been conducted; however, samples from boring B-20 were previously collected and analyzed for metals, SVOCs and VOCs. The Drum Crusher is located between the southwest corner of Building D and the Processing Area. The Drum Crusher was used to crush empty drums prior to disposal. Soil samples collected during previous investigations in areas directly south and north of SWMU #10 indicate soil impacts of VOCs and metals at 3 ft bgs and VOCs only at 16 ft bgs. Due to the handling of waste fuel in this area, in addition to VOCs, SVOCs and metals, select samples collected were also analyzed for DRO. One soil boring (S10-1) was initially planned to groundwater in the area of SWMU #10. However, due to a high PID reading (15,000 ppm) in boring S10-1 at a depth of 10 ft, an additional boring (S10-2) was advanced and samples were collected at five, 10, 15, and 20 ft bgs. A groundwater sample was collected from the upper zone in boring S10-1. Samples were submitted for laboratory analysis as shown on Table 3.

4.4.1.4 SWMU #11 – Crushed-Drum Roll-Off Boxes

This SWMU is located south of Building D. The area served to stage roll-off boxes used for disposal of empty drums crushed by the Drum Crusher (SWMU #10).

During the Phase I RFI initial field investigations in 1999 two borings were advanced in this area for investigation of other SWMUs located within Building D. Samples were collected from the two borings from one-three ft bgs and 16 ft bgs and submitted for analysis of a combination of metals, SVOCs, and VOCs. Results indicated impacts of metals and VOCs. Phase IV sample collection included samples collected for analysis of metals and VOCs. Due to the handling of waste fuel in this area, select samples collected were also analyzed for DRO.

Samples collected in this area were also analyzed for general chemistry and geotechnical parameters. General chemistry was collected to gather data that may be useful in determining future viable soil remedial actions.

Based on the results of the initial phase of the Phase IV field work, this area and the area approximately 70 ft to the east and south of this area was heavily investigated during the subsequent field events in December 2013 and January 2014. A total of 29 borings were advanced over the entire SWMU #11 investigative area. Four borings were completed during the initial phase, nine were completed in December 2013 and an additional 16 were completed during January 2014. From the 29 borings 138 soil samples were collected. Groundwater was collected from three soil borings in the upper zone (S11-1, S11-2 and S11-3) and one groundwater sample was collected from soil borings in the lower zone (S11-1a). All samples were submitted for laboratory analysis as shown on Table 3.

4.4.1.5 SWMU #13 – Drum Dock

The Drum Dock is utilized for container storage, treatment, and management. The SWMU is currently an active operational area of the facility and is primarily used for storage of drums as they enter and exit the facility. No previous investigations have been conducted specific to this SWMU. Phase IV sample collection included samples collected for analysis of metals, SVOCs and VOCs. Soil samples were collected from four soil borings S13-1 through S13-4 and groundwater samples were collected from the upper zone in three borings (S13-1, S13-2 and S13-3). Samples were submitted for laboratory analysis as shown on Table 3.

4.4.1.6 SWMU #14 – Building C Drum Storage Warehouse

Building C is currently an active operational area of the facility. It functions as a container storage, treatment, and management area as the containers enter or exit the facility. No previous investigations have been conducted specific to this SWMU; however, two borings were advanced in 1999 as part of the Phase I RFI field investigation directly northeast of the building to investigate SWMU #12 (Warm Room). The 1999 samples were collected from the top three ft of soil and analyzed for metals and VOCs.

Since this is an active operational area, sample collection was primarily along the perimeter of the SWMU with limited sample collection in the interior. Phase IV sample collection included samples collected for analysis of metals, SVOCs and VOCs. During the initial field event in October 2013 five borings were advanced in and around the building. Based on the October results, during the December, January and February events 12 additional borings were advanced at five ft intervals down to 20 ft. A total of 101 soil samples were collected from all 17 borings. Groundwater samples were collected from two borings (S14-2 and S14-4) just below the water table of the upper zone. All samples were submitted to the laboratory for analysis as summarized on Table 3.

4.4.2 Investigation of Eight SWMUs for Corrective Action Purposes and Closure Activities

In conjunction with a permit renewal application, the facility had prepared and submitted a Project Management Site Implementation Plan (Closure Plan) summarizing closure activities associated with the removal of tanks associated with SWMU #7, and the decommissioning of buildings B, D, and J. The Closure Plan identified processes for site decontamination and sampling activities required to close portions of the facility for operational use. Sampling activities to satisfy the Closure Plan was included in the Phase IV RFI field investigation work. However, the facility was unable to complete the required decontamination activities prior to the Phase IV field investigation. For SWMU #7 and buildings B, D, and J, the Phase IV RFI

sample locations were based on the approved Closure Plan. Because decontamination was not completed prior to the field investigation, additional samples along cracks and sumps were not collected during the field investigation. Deeper samples were collected from select borings to evaluate the need for corrective action beneath the building. The specific buildings scheduled for decommissioning and the sampling rationale are discussed below.

4.4.2.1 SWMU #5- SPARGING AREA

The sparging area formerly housed three steam-heated spargers used for stripping tetrachloroethene (PCE) from dry cleaning canisters and filters. The area is located in the southwest corner of Building D and contains a blind sump. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one-ft to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, and VOCs. VOCs, metals, and SVOCs were detected in the previous investigation samples.

Building D is undergoing RCRA closure and is currently being considered for demolition. The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 15 by 15 ft grid. Soil samples were collected from eight soil borings and one groundwater sample was collected from the upper zone in boring DC-Sump. All samples were submitted to the laboratory for analysis as summarized on Table 3.

4.4.2.2 SWMU #6 – HOT ROOMS

This SWMU is approximately 25 ft by 10 ft and includes two small rooms that were warmed to 190 degrees. The warm temperature would lower the viscosity of certain wastes such as waxes and greases prior to waste blending. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, and VOCs. VOCs, metals, and SVOCs were detected in the previous investigation samples.

Phase IV RFI sample collection included the closure samples for VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area on a 15 by 15 ft grid; however, the room is small and resulted in the advancement of a single boring. Soil samples were collected from one soil boring and submitted for laboratory analysis as shown on Table 3. No groundwater samples were collected.

4.4.2.3 SWMU #7 – ELEVATED TANK STORAGE AREA

The elevated tank area is located in the northwest corner of Building D. The tanks have been emptied, cleaned and removed. They were formerly used to store recycled PCE, chlorinated solvent waste water, oils, diesel fuel, and nonhazardous waste oil. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, and VOCs. VOCs, metals, and SVOCs were detected in the previous investigation samples.

The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 25 by 25 ft

grid. Soil samples were collected from three soil borings and groundwater from the upper zone was collected from boring DC-3. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.2.4 SWMU #8 – REGULATED WASTE STORAGE AREA

This area is located in the north-central and northeast portion of Building D. The area is diked and was historically permitted to store non flammable or reactive hazardous wastes in containers. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one-ft to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, VOCs and DRO. VOCs, metals, and SVOCs were detected in the previous investigation samples.

The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 25 by 25 ft grid. Soil samples were collected from 10 soil borings (DC-4 through DC-11, DC-29 and DC-30). Groundwater samples were collected from two borings (DC-6 and DC-9) and analyzed for VOCs. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.2.5 SWMU #9 – SOLIDS DRYER

This area covers the south-east corner of Building D and formerly was used to recover solvents from shredded dry cleaning filters. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, VOCs and DRO. VOCs, metals, and SVOCs were detected in the previous investigation samples.

The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 15 by 15 ft grid. Soil samples were collected from eight soil borings (DC-12, DC-13, DC-14, DC-15, DC-16, DC-17, DC-17, and DC-20) and a groundwater sample from the upper zone was collected from soil boring DC-17 and analyzed for VOCs. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.2.6 SWMU #21 - CYCLONE

The Cyclone was located in secondary containment along the wall in the south-central portion of Building D. The machine was used to recover solid material from the shredder/granulator but has been dismantled and removed. Soil samples were collected during the initial Phase I RFI field investigation in 1999 and Phase II RFI field investigation in 2001 at depths ranging from one to 16 ft bgs in and around Building D. Samples were analyzed for a combination of metals, SVOCs, and VOCs. VOCs, metals, and SVOCs were detected in the previous investigation samples.

The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 25 by 25 ft

grid. Soil samples were collected from a single boring (DC-19) and submitted to the laboratory for analysis as shown on Table 3.

4.4.2.7 BUILDING J

Building J is a large warehouse on the east side of the facility historically used for drum storage of flammable and chlorinated solvents, chemical product distribution and office space. It is currently used as a laboratory pack/repack area. At the time of the field work in October 2013 Building J was being considered for RCRA closure. The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Subsequent to the field efforts, Building J was removed from the closure list and will continue to be used as an operational area of the Facility while other soil interim measures are being conducted. Samples were collected within this area using a 25 by 25 ft grid. Soil samples were collected from 14 soil borings (JC-1 - JC-14). Seven groundwater samples were collected from the upper zone and one lower zone groundwater sample was collected from a boring (JC-5a). All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.2.8 BUILDING B- SWMU #16 - THE CORROSIVE WASTE STORAGE AREA

The former Corrosive Waste Storage Area (SWMU #16) is located in the western portion of Building B where containers of corrosive and non-ignitable hazardous wastes were stored prior to shipment off-site or further processing within the facility.

During the Phase I RFI field investigation in December 1999 three samples were collected from two borings at depths ranging from 4 inches to six ft bgs and analyzed for metals and VOCs. The Phase IV RFI sample collection included the closure suite of analytes that consist of VOCs, SVOCs, metals, PCBs, DRO, pesticides, and herbicides. Samples were collected within this area using a 15 by 15 ft grid. Soil samples were collected from five soil borings (BC-1 through BC-5) and one groundwater sample was collected from the upper zone (BC-2) and analyzed for VOCs. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.3 Investigation of Two Additional Area of Concern (AOC)

4.4.3.1 AOC #11 – BULK STORAGE TANKS BETWEEN THE WARMING ROOM AND PROCESSING AREA

This area formerly housed two 4,500-gallon tanks for storage of waste solvent prior to processing through the solvent still. The area includes a transfer area where solvent was transferred to/from the tanks using a pump from a portable tank mounted on a truck. Samples were not collected in this area during previous RFI field investigations. The Phase IV RFI sample collection included analytes that consist of VOCs, SVOCs and metals. Soil samples were collected from one soil boring (A11-1) and a groundwater sample was collected from the upper zone. Samples were submitted for laboratory analysis as shown on Table 3.

4.4.3.2 AOC #12 – AREA OF ELEVATED RADIUM-226

There is a small area located between the northwest corner of Building I and a storm drain near the north property fence where elevated concentrations of radium-226 were detected during a surface radiological survey conducted by KDHE. The survey was conducted using screening techniques to see evaluate potential

impacts from historic handling of wastes from radium dial shops. Radiological data was obtained from samples collected in the immediate area and outside the defined areal extent of the AOC to further delineate the extent of any radium 226 impacts.

To satisfy KDHE radiological materials licensing requirements, USA Environment, LP, was retained to provide a radioactive materials license and safety oversight during the October 2013 field event. On September 9, 2013, USA Environment conducted a facility wide gamma walkover combined with GPS logging to gather more background data. In addition to the gamma walkover, 16 soil samples (15 from discrete locations and one as a 10-point composite) were collected and submitted for analysis of radiochemical parameters including Bismuth-214, Cobalt-60, Cesium-137, Potassium-40, Lead-210, Radium-223, 226, 228, Thallium-208, Uranium 235 and 238. All radiological survey work was performed at the request of and under the supervision of KDHE. The findings of the USA Environment radiological survey were presented in the *Site Radiological Characterization Report* (USA Environment, November 2013), which has previously been submitted to USEPA and KDHE.

During the Phase IV field investigation soil samples were collected from ten soil borings (A12-1 through A12-10). Additionally, five surficial soil background samples (BG-1 through BG-4 and S24-1) were collected onsite and offsite for analysis of radiochemistry background concentrations. Samples BG-1 through BG-4 were collected at upgradient, off-site areas of opportunity that have not been influenced by facility operations. Boring A12-1D was advanced into the lower groundwater zone (approximately 25-30 ft bgs). Data from this sample was used for lithology definition and groundwater sample collection. Groundwater samples were collected from the upper zone in two borings (A12-1 and A12-3), one from the upper zone just above the clay layer (A12-1D-Clay), and another one in the lower zone just below the clay layer (A12-1D-Lower). Samples were submitted for laboratory analysis as shown on Table 3.

4.4.4 Investigation of SWMU #1, SWMU #4 and SWMU #25

SWMUs #1, 4, and 25 have had limited investigations conducted in areas surrounding their boundaries. They are currently active operational areas of the facility. Following is a brief description of each area.

4.4.4.1 SWMU #1 – Processing Area Storage Tanks

During the Phase IV RFI field investigation SWMU #1 was an active area that houses eight aboveground storage tanks that contain various hazardous wastes, non-chlorinated petroleum solvents and chlorinated solvents. Subsequent to the initial phase of work for the RFI Phase IV field investigation, Clean Harbors decided that this SWMU would be closed under the Permit. Samples required to comply with the Facility Closure Plan were not collected as part of this RFI investigation.

This SWMU has not been previously investigated. Due to the nature of operations, samples that were collected were submitted for analysis of a combination of metals, VOCs, and SVOCs. Two borings were advanced in this SWMU. When selecting the sample locations, there were multiple structures and obstacles that were obstructing the pathway or location of the proposed borings. Locations were modified to be as close to the planned location as possible. Soil samples and upper zone groundwater samples were collected from two soil borings (S1-1 and S1-2) and submitted for laboratory analysis as shown on Table 3.

4.4.4.2 SWMU #4 - PROCESSING AREA TRUCK BAY

SWMU #4 is currently an active truck bay used for transfer of wastes between tank trucks and SWMU #1. The bay has beamed curbs and a centrally located blind trench sump. No historical releases are known to have occurred in this area. Subsequent to the initial phase of work for RFI Phase IV, it was decided that this SWMU would be closed. Any samples required to comply with the Facility Closure Plan will be collected during a separate field event and are not part of this RFI Report.

This SWMU has not been previously investigated. Due to the nature of operations, samples that were collected were submitted for analysis of a combination of metals, VOCs, and SVOCs. Two borings were advanced in this SWMU. Soil and upper zone groundwater samples were collected from two soil borings (S4-1 and S4-2) and submitted for laboratory analysis as shown on Table 3.

4.4.4.3 SWMU #25 – BUILDING 1

SWMU #25 is also referred to as AOC#3 and is in Building 1 located in the eastern portion of the facility. This building historically was used for solvent distillation and processing. A total of 25 soil samples have been collected in this area over since 1999. The initial sample collection occurred during the Phase I RFI field investigation work in 1999 when 11 samples were collected from depths ranging from four-inches to 16 ft bgs. Samples were analyzed for a combination of metals, and VOCs. An additional 13 samples were collected at depths ranging from one ft to 16 ft bgs in the area around SWMU #25 in 2001 during the Phase II RFI field investigation. Samples were again submitted for analysis of metals and VOCs. A verification sample was collected in 2005 from 6 ft bgs and analyzed for VOCs. Results of the above samples showed the presence of low concentrations of chlorinated hydrocarbons and metals. The Phase IV RFI sample collection included analytes that consist of metals, SVOCs sand VOCs. Soil and upper zone groundwater samples were collected from two borings (S25-1 and S25-2) and submitted for laboratory analysis as shown on Table 3.

4.4.5 Investigation of SWMU #22 (Solvent Still Area)

The former Solvent Still Area is located off the southwest corner of Building 1. The area is covered by concrete. Four soil samples from two borings were collected near SWMU #22 during the Phase II field investigation in 2001. Samples were collected from depths of one ft bgs and 15 ft bgs in each boring. The samples were analyzed for VOCs. Results of the above samples showed the presences of low concentrations of VOCs in deeper soils near the water table. The Phase IV RFI sample collection included analytes that consist of VOCs. Radio chemistry samples were also collected due to the proximity of the SWMU to AOC#12. Soil and upper zone groundwater samples were collected from two borings (S22-1 and S22-2) and submitted for laboratory analysis as shown on Table 3.

4.4.6 Evaluation and Characterization of Vertical Distribution of Contaminants in Groundwater

The vertical distribution of contaminants in groundwater evaluation has two objectives.

1. To evaluate whether samples collected from monitoring wells with screen lengths of 15 ft or longer were introducing a low bias to groundwater quality data due to sample dilution.

2. To evaluate the presence of a concentration gradient for select VOCs with depth within upper zone groundwater at the facility.

These objectives were addressed using data collected as part of the routine semi-annual groundwater monitoring during the period 2010 – 2013 and data collected through use of HS samplers in three existing wells, SK-2S, SK-12S, and SK-1S. Wells SK-2S, SK-12S, and SK-1S are located downgradient from existing contaminant source areas. The four COCs with the highest concentrations (PCE, TCE, Cis-1,2-dichloroethene (cis-1,2-DCE), and 1,1-dichloroethane (1,1-DCA)) were selected for this evaluation.

The HS samplers allowed for the collection of a depth discrete sample from the screened interval of a monitoring well without purging. The HS collected a core of water from a two-foot section of well screen, with minimal displacement and disturbance of the water column. Once full, the sample was sealed within the sleeve eliminating contact with other fluids in the water column. Multiple sleeves were deployed in each well to determine the depth discreet concentrations of contaminants along the entire well screen.

Five HS samplers were deployed in each well to determine the concentrations of contaminants along the ten-foot sampling interval. Each HS sampler has the capacity of one liter when filled and were attached to a tether at 24-inch intervals corresponding to the two, four, six, eight, and ten ft depths below the water table. A total of 15 samples from three wells were collected from the HS.

A Geoprobe boring with a two foot screened end point was advanced at locations adjacent to permanent wells SK-1S, SK-2S, and SK-12S. Geoprobe boring locations were equivalent to the corresponding depth at which HS samplers were deployed in the nearby wells. Samples were collected from each permanent well and Geoprobe boring location using low flow purging and sampling techniques. Samples from the permanent wells were collected from a depth of two feet below the water surface. In addition, groundwater data from the routine semi-annual groundwater monitoring events was also compared to the Geoprobe water sample results and the HS sample results to evaluate the vertical distribution of VOC contaminants within the upper zone.

4.4.7 Vertical Contaminant Distribution Evaluation Method

VOC data utilized for evaluating the vertical distribution of contaminants in groundwater at the site included:

- Data from permanent wells SK-1S, SK-2S, and SK-12S,
- Data from HS samplers from wells SK-1S, SK-2S and SK-12S,
- Data collected from Geoprobe borings adjacent to permanent wells SK-1S, SK-2S, and SK-12S, and

- Data collected as part of routine groundwater sampling activities during the period from October 2010, through October 2013.

Data were evaluated with respect to depth and concentrations and summarized to evaluate whether samples collected from monitoring wells with screen lengths of 15 ft or longer were introducing a low bias to groundwater quality data due to sample dilution and to evaluate the presence of a concentration gradient for select VOCs with depth within upper and lower zones for at the facility.

4.4.8 Characterization and Three-Dimensional Downgradient Delineation To Support CA 750

The facility currently has a "YE" status for Human Exposure Environmental Indicator in the USEPA RCRA Cleanup Baseline database. A "YE" indicates that "Current Human Exposures Under Control" has been verified. However, the status of the Groundwater Environmental Indicator is entered as "IN", indicating that more information is needed to make a determination.

During the Phase IV RFI field investigation 247 soil borings were drilled. From these borings, 892 soil samples, 111 groundwater samples, 22 sediment/porewater samples, five surface water samples, five macroinvertebrate samples, and five air quality samples were collected. Data obtained from this sampling effort is expected to provide the needed information to confirm the "YE" status for groundwater and will be used to apply for a positive determination ("YE") for the Groundwater Environmental Indicator.

4.4.9 Investigation of Chisholm Creek

Data collected to conduct a Screening Level Ecological Assessment to determine the potential for adverse effects to ecological receptors, and habitat associated with Chisholm Creek included collection of 11 porewater samples from below the creek surface, five sediment samples from the creek bed, five surface water samples, and collection of five aquatic detritus samples required to complete a macroinvertebrate survey. Sediment, surface water, and porewater data was compared to generic ecological screening benchmarks. The macroinvertebrate survey was conducted by comparing analytical results of the sediment, porewater, and surface water data along with habitat parameters to the macroinvertebrate results.

4.4.10 Evaluation of Existing Monitoring Well Network

At the time of the RFI investigation, the groundwater monitoring network at the facility consisted of 19 wells screened in the upper zone and 12 wells screened in the lower zone. Seventy-two groundwater samples were collected as part of this Work Plan to characterize and delineate the impacted groundwater in the both the upper and lower zones. Subsequent to the investigation, 11 wells have been decommissioned in accordance with the State of Kansas requirements. Based on the results of this RFI, recommended modifications to monitoring well network are provided in Section 6.5.

4.4.11 Investigation of Other SWMUS or AOCs for Source Control

During the process of reviewing current and historic facility operations six additional SWMUs previously investigated had data gaps requiring additional data to fully delineate the impacts to soil. These six areas include SWMU #17, SWMU #18, SWMU #24, AOC #10, area southeast of Building J, and SWMU #20.

4.4.11.1 SWMU #17 - DRY SOLIDS GONDOLA

SWMU #17 is the former Dry Solids Gondola area located just south of Building C. It has historically contained wastes that were sent offsite for landfill disposal that included soil, metal impacted debris, non-flammable paint, and non-blendable solids. The shallow groundwater has known VOC impacts in this area; however, a specific source has not been determined.

Soil samples have been collected in and around this SWMU since 1999. The initial sample collection occurred during the Phase I RFI field investigation in 1999 when five samples from four borings were collected from the surface down to 12 ft bgs and analyzed for a combination of metals, VOCs, and pesticides. Chlorinated VOCs were detected, in a majority of the shallow borings at higher concentrations then in the deep samples. Metal results did not exceed representative background concentrations for the Wichita area (Table 5-1 of the RFI Report, 2006). Pesticide results were not detected above the laboratory reporting limit.

Additional data to delineate the VOC impacts to soil were collected during the Phase II RFI field investigation in 2001. Phase III RFI field investigation in 2002 and the supplemental 2005 field investigation. The Phase IV RFI included sample collected for analytes that consist of metals, VOCs and general chemistry parameters. Soil samples were collected from three borings (S17-1, S17-2, and S18-4). Upper zone groundwater samples were collected from borings S17-1, S17-2 and S18-4. A lower zone groundwater sample was collected from boring S17-1a. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.11.2 SWMU #18 – OPEN AREAS IN SOUTHWESTERN PORTION OF SITE

SWMU #18 is an open undeveloped area in the southeastern portion of the facility. It has been divided into two areas of interest, the trailer parking area and the area located along the southern fence line. This area has not been used for any waste handling or storage; however, empty drums, old equipment, and tires may have been historically been stockpiled here. The shallow groundwater has known VOC impacts in this area.

Soil samples have been collected in and around this SWMU since 1999. The initial sample collection occurred during the Phase I RFI field investigation in 1999 when 13 samples from 12 borings were collected from the surface down to 10 ft bgs and analyzed for a combination of metals, SVOCs and VOCs. Additionally, the surface sample collected from boring B-30 was analyzed for pesticides. Results indicated the presence of VOCs and metals.

Additional data to delineate the metal and VOC impacts were collected during the Phase II RFI field investigation in 2001 and 2002, and the Phase III RFI field investigation in 2003 and the supplemental 2005 field investigation. The Phase IV RFI sample collection included sample collected for VOCs.

Borings S18-2D and S18- 5D were advanced into the lower groundwater flow zone (approximately 25-30 ft bgs) to the weathered bedrock. The purpose of this boring was to gather additional subsurface lithologic in the southwestern portion of the facility. Soils samples for geotechnical parameters were collected from the saturated lower zone of S18-5D. Soil samples were collected from 19 borings (S18-1 through S18-6) and four groundwater samples were collected from the upper zone in four soil borings. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.11.3 SWMU #24

SWMU #24 is an open undeveloped area located south of Building C. Use of the area has not formally been defined and historically it was not recognized a waste management unit. Historical investigations in this area overlap with that of SWMU #17.

Soil samples have been collected in and around this SWMU since 1999. The initial sample collection occurred during the Phase I RFI field investigation in 1999 when three samples from two borings were collected from the surface down to 12 ft bgs and analyzed for metals, VOCs, and pesticides. Chlorinated VOCs were detected, in a majority of the shallow borings at higher concentrations then in the deep samples. Metals and pesticide results were either not detected or did not exceed established background concentrations.

Additional data to delineate the VOC impacts to soil were collected during the Phase II and III RFI field investigations. The Phase IV RFI included samples for VOC analysis. One sample was also analyzed for metals and SVOCs. Radio chemistry samples were collected from boring S24-1 to determine background radium concentrations at the facility. Soil samples were collected from five borings (S24-1 through S24-4, as well as S24-1d) and four upper zone groundwater samples were collected from borings S24-1 through S24-4. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.11.4 AOC #10 (OA#6) – NORTHEASTERN CORNER

AOC #10 (OA#6) is and open undeveloped area located in the northwestern corner of the facility. This area was possibly used historically for bulk storage. The area has been divided into two smaller areas identified as the northwestern corner, and area east of Building I.

Soil samples have been collected in this area since 1999. The initial sample collection occurred during the Phase I RFI field investigation in 1999 when surface soil samples and a sample at 16 ft bgs were collected from two borings and submitted for VOC analysis. Shallow samples were also submitted for metals analysis. Analytical results indicated the presence of VOCs and metals.

Additional VOC and metal samples were collected during the Phase II RFI field investigation in 2001, Phase III RFI field investigation in 2002 and the supplemental 2005 field investigation. The Phase IV RFI sample collection included VOC and metals samples.

Soil samples were collected from five soil borings (A10-1 through A10-5 and S3-1 and S3-2). Groundwater samples were collected from the upper zone in three soil borings (A10-3, A10-4, and A10-5). Samples were submitted for laboratory analysis as shown on Table 3.

4.4.11.5 SOUTHEAST BUILDING J

The area is a paved area located south of Building J. Phase I RFI data indicated a potential source of VOC contamination in the groundwater in and around existing monitor well SK-1S and historic boring EB-5.

A limited number of samples have been collected historically south of Building J. Phase I RFI samples identified the presence of VOCs, metals in shallow soil. Additional VOC samples were collected during the

Phase III RFI in both 2002 and 2005 and VOCs were detected in both shallow and deeper soils. The Phase IV RFI included collection of VOC samples to further delineate these impacts. Soil samples were collected from 14 borings (SEBJ-1 through SEBJ-14). Upper zone groundwater samples were collected from three borings (SEBJ-1, SEBJ-2 and SEBJ-3). All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.11.6 NORTH BUILDING J

A rail spur exists between Building I and Building J on the east side of the property. This rail spur was reportedly used for loading and offloading solvents. Soil samples collected during the Phase I RFI work in 1999 identified the presence of VOCs in shallow soil. During Phase III work in 2005, verification samples for VOCs were collected at 0.5 ft bgs and 6 ft bgs. 1,2,4-TMB was detected at a concentration above the IAO of 1,070 micro grams per kilo gram (µg/kg) in the sample collected at 6 inches bgs in 2005. The Phase IV RFI included collection of additional VOC samples. Soil samples were collected from five soil borings (NBJ-1, NBJ-1a, NBJ-2, NBJ-3, and NBJ-4). One upper zone groundwater sample was collected from boring NBJ-1 and one groundwater sample was collected from boring NBJ-1a at a depth of 25-27 ft bgs in the upper zone just above the clay later. All samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.11.7 SWMU #20 - FORMER BURIED PAINT CAN PIT

SWMU #20 is the Former Paint Can Burial Pit. Some old paint cans and waste were removed previously from this area. The Phase IV RFI included metals and VOC samples to determine if any residual material exists. Soil samples were collected from three borings (S20-1, S20-2, and S20-3), and one upper zone groundwater sample was collected from boring S20-1. Samples were submitted to the laboratory for analysis as shown on Table 3.

4.4.12 Other Area – AOC #8 POSSIBLE FORMER DRUM STORAGE AREA

Previous investigations included one boring and a single sample collected at three ft bgs. The sample was submitted for analysis of VOCs, metals, and DRO. No VOCs or DRO were detected in the sample. None of the metals exceeded the representative background concentrations.

The Phase IV RFI included installation of one boring in AOC#8 (A8-1). Shallow, intermediate and deep soil samples were collected and submitted for analysis of VOCs.

4.5 INVESTIGATION OF POTENTIAL INDOOR AIR RISKS

Groundwater and soil impacts at the facility are known to occur in and around buildings that are currently active. A sampling program was implemented to investigate the impacts of indoor air within these active buildings.

For operational areas of the facility (Building C), indoor air quality and sub-slab vapor sampling were deferred until after the selected remedy has been implemented. However, the administrative building (Building E) that houses the facility offices was investigated for vapor intrusion by collecting two breathing zone air samples

and two sub-slab soil gas samples, and a single background sample. Building E has a partial basement that houses offices and files. The rest of the building is built on a slab at grade.

In accordance with KDHE Guidance, samples were collected in Building E near sources of potential intrusion and heating ventilation and air conditioning (HVAC) intake areas. All sample collection procedures were performed in accordance with KDHE BER 33 and 34 and the analytical laboratory sample collection guidance presented in the RFI Phase IV Work Plan SAP. All samples were analyzed for VOCs.

One breathing zone air sample was collected in the basement office and the second was collected in a main floor closet that was over a foundation slab and contained multiple conduits from the sub-slab space. Two sub-slab samples were collected, one from the basement level, and the second from the main floor in an area over the foundation slab. A fifth air sample was collected to determine ambient (i.e. background) concentrations. The background sample location was chosen such that it was outside and away from facility operations.

4.6 Soil Results of Phase IV RFI

Section 4.6 discusses results of subsurface sampling, laboratory analysis, and identifies exceedances of IAO's in soil samples collected during the Phase IV RFI. Section 5.0 summarizes the nature and extent of impacts to soils, groundwater, indoor air quality, and Chisholm Creek based on all data collected to date.

Soil analytical data was compared to IAOs shown on Table 4. The IAO concentrations were proposed in the Draft IMWP which was conditionally approved by USEPA in an email dated May 6, 2014. The IAOs are based on site screening levels (SSLs) from the KDHE Tier 2 Guidance for Residential and Non-Residential pathways, and USEPA Region 9 RSLs for groundwater and industrial soils. A summary of all data exceeding the IAOs for soils is presented in Table 5.

The facility has been divided into three regions (Western, Central, and Eastern) for purposes of presenting the results of the field investigation. These regions are consistent with the data presentations in both the Draft IMWP and the Human Health Risk Assessment (HHRA). Within each region, the results of the Phase IV field investigation are also divided into four layers (Shallow Soils (0 – 5 ft bgs), Intermediate Soils (5 – 10 ft bgs), Deep Soils (10 ft bgs to the top of the saturated zone) and the Saturated Zone.

Where appropriate, the Eastern region includes offsite samples collected between the facility boundaries and Chisholm Creek. Figure 13 depicts the different regions of the facility.

4.6.1 Western Region

The Western Region includes all areas of the facility to the west of the Processing Area. The Western Region includes the following SWMUs:

- SWMU #13 Drum Dock – south of Building C,
- SWMU #14 Drum Storage Warehouse - Building C,

- SWMU #24 Area South of Building C,
- SWMU #17 Former Dry Solids Gondola, and
- SWMU #18 Trailer Parking and Open Area along Southwestern Corner Open Area.

The western area also includes samples collected within Building C. Three VOCs were identified above the IAOs in shallow soils in the western region of the Facility.

The VOC detections above IAOs in the Western Region are present in three separate smaller areas: one in Building C and the surrounding area (SWMU #13, #14, #17 and #24), a second area near the trailer parking lot (SWMU #18), and the third at the southwest fence line (SWMU #18).

4.6.1.1 BUILDING C (SWMUs #13, #14, AND #24)

COCs detected above IAOs in SWMU #13 (Building C Drum Dock), SWMU #14 (Building C) and SWMU #24 (Area south of Building C) are discussed below.

4.6.1.1.1 ***Shallow Soils***

A total of 56 shallow soil samples were collected from 18 borings for analysis of VOCs, SVOCs, metals, and radio chemistry. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Three VOCs (PCE, TCE and cis-1,2-DCE) in 16 samples were present at concentrations exceeding IAOs. The IAO for PCE (121 µg/kg) was exceeded in eleven samples. The highest VOC concentration detected was PCE (109,000 µg/kg) in the sample collected from S24-3-2. Seven samples exceeded the IAO for TCE (84.7 µg/kg), with a maximum concentration of 31,700 µg/kg in the sample S14-5-0.5. Sample S14-5-0.5 also exceeded the IAO for cis-1,2-DCE (855 µg/kg) with a concentration of 3,760 µg/kg.

SVOCs: There were no exceedances of the IAOs.

Metals: There were no exceedances of the IAOs.

4.6.1.1.2 ***Intermediate Soils***

A total of 24 intermediate soil samples from 16 borings were collected for analysis of VOCs. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Samples S24-3-10 and S14-8-10 exceeded the IAO for PCE (121 µg/kg). The maximum concentration of PCE detected was 2,350 µg/kg in the sample collected from S24-3-10.

4.6.1.1.3 ***Deep Soils***

A total of 45 deep soil samples (11 to 44 ft bgs) from 26 borings were submitted for analysis of VOCs. Additionally, a background radio chemistry sample collected at 15 ft bgs in SWMU #24. Soil analytical data

for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE was detected above the IAO (121 µg/kg) in three samples at a concentrations of 394 µg /kg in sample S13-2-INT, 231 µg/kg in sample S14-9-15, and 503 µg/kg in sample S24-3-15.

TCE was detected above the IAO (84.2 µg/kg) at a concentration of 221 µg/kg in the sample collected at the soil groundwater interface located at 14.8 ft bgs in S14-4-INT.

4.6.1.2 FORMER DRY SOLIDS GONDOLA (SWMU #17)

Analyte detections above IAOs in the SWMU #17 are discussed below.

4.6.1.2.1 ***Shallow Soils***

Nine shallow soil samples from three borings in SWMU #17 were submitted for VOC and metals analysis. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Two samples (S17-1-2 and S17-1-5) exceeded the IAO for PCE (121µg/kg). PCE was detected in soil samples from S17-1-2 and S17-1-5 at concentrations of 2,800 µg/kg and 170 µg/kg, respectively.

Metals: There were no metals exceedances for samples collected in the shallow soils in SWMU #17.

4.6.1.2.2 ***Intermediate Soils***

A total of 4 intermediate soil samples from three borings were submitted for analysis of VOCs and Metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Two samples exceeded the IAO for PCE (121µg/kg). Samples S17-1-10 and S17-1-10 split had a reported concentration of 622 µg/kg and 795 µg/kg, respectively.

Metals: There were no exceedances of the IAOs for samples collected in the intermediate soils in SWMU #17.

4.6.1.2.3 ***Deep Soils***

Eight deep soil samples (13 to 35 ft bgs) were collected from three borings for analysis of VOCs and Metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE was the only VOC detected above the IAO in deep soils from SWMU # 17. The PCE IAO was exceeded in one sample, S17-1-13 at 1,540 µg/kg.

4.6.1.2.4 ***Saturated Soils***

VOCs: PCE was the only VOC detected above the IAO in saturated soils. PCE Concentrations ranged from 982 µg/kg to 5,330 µg/kg.

4.6.1.3 TRAILER PARKING AREA (SWMU #18)

Analyte detections above IAOs in the SWMU #18 (Trailer Parking Area and along Southwestern Fence) located south of the Former Dry Solids Gondola, are discussed below.

4.6.1.3.1 ***Shallow Soils***

A total of 41 shallow soil samples were collected in SWMU #18 and analyzed for VOCs and Metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE exceeded the IAO (121 µg/kg) in nine samples at concentrations ranging from 133 µg/kg to 29,500 µg/kg.

Metals: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #18.

4.6.1.3.2 ***Intermediate Soils***

A total of 12 intermediate depth samples were collected from 12 borings and submitted for analysis of VOCs and Metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE exceeded the IAO in one SWMU #18 intermediate soil sample. PCE exceeded the IAO (121 µg/kg) in sample S18-19-10 at a concentration of 2,029 µg/kg.

Metals: There were no exceedances of the IAOs for samples collected in the intermediate soils in SWMU #18.

4.6.1.3.3 ***Deep Soils***

A total of 31 deep soil samples were collected from 14 borings in SWMU #18 and analyzed for VOCs. Soil analytical data for compounds present at concentrations exceeding the IAOs are summarized in Table 5 and discussed below.

VOCs: PCE and cis-1,2-DCE were the only VOCs detected above their IAOs. Soil sample S18-19-15 contained cis-1,2-DCE at 917 µg /kg., which exceeds the IAO of 855 µg/kg. PCE concentrations that exceed the IAO (121 µg/kg) were detected in six samples at concentrations ranging from 157 µg/kg to 8,660 µg/kg.

4.6.2 Central Region

- The Central Region includes Buildings A, B, D, E, G, and H and the Processing Area and consists of 13 SWMUs and two AOCs.
- SWMU #1 Processing Area Storage Tanks,
- SWMU #2 Waste Blending and Drum Processing Area- located between Buildings C and D), and
- SWMU #3 Former Drum Processing Area- located between Buildings C and D).

- SWMU #4 Processing Area Truck Bay – south of the Processing Area.
- SWMU #5 Sparging Area - southwest corner of Building D.
- SWMU #6 Hot Rooms. south portion of Building D.
- SWMU #7 Elevated Tank Storage Area - western portion of Building D.
- SWMU #8 Regulated Waste Storage Area - north-central and northeast portion of Building D.
- SWMU #9 Solids Dryer - south-east corner of Building D.
- SWMU #10 Drum Crusher – located between the southwest corner of Building D and the Processing Area.
- SWMU #11 Crushed-Drum Roll-Off Boxes - located south of Building D.
- SWMU #16 Corrosive Waste Storage Area - western portion of Building B.
- SWMU #20 Former Paint Can Burial Pit – southwest of Building B.
- AOC#8 Former Drum Storage Area – east of Building A.
- AOC#11 Bulk Storage Tanks northwest corner of the Processing Area .

Detected constituents above IAOs are present in two separate source areas: one small area west of Building B and the second larger area that includes Building D, the Processing Area and the driveway between Building D and Building B.

4.6.2.1 BUILDING D AND THE PROCESSING AREA (SWMU #1, #2, #3, #4, #5, #6, #7, #8 #9, #10, #11, #21 AND AOC#11)

Building D is undergoing RCRA closure. The SWMUs associated with Building D are generally small and immediately adjacent to each other. Therefore, the results of this area including analyte detections above IAOs in the SWMUs associated with Building D, are discussed as a whole below.

4.6.2.1.1 ***Shallow Soils***

During the Phase IV RFI a total of 155 shallow soil samples were collected from 68 borings in the 12 SWMUs and AOC#11 located in the vicinity of Building D and analyzed for VOCs, SVOCs, herbicides, pesticides, PCBs, DRO, and metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: There were seven VOCs with concentrations exceeding IAOs. PCE exceeded the IAO in 60 samples. TCE concentrations exceeded the IAO in 52 samples. The highest VOC concentration was from a sample collected in SWMU #10. PCE was detected at a concentration of 308,000 µg/kg in sample S10-1-0.5.

SVOCs: Aniline exceeded the IAO of 1,950 µg/kg in two samples, SWMU #5 sample DC-23-0.5 collected at six inches bgs and SWMU #8 sample DC-6-2 collected at two ft bgs at concentrations of 2,680 µg/kg and 2,160 µg/kg, respectively.

Herbicides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMUs #5, #6, #7, #8, #9 and #21.

Pesticides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMUs #5, #6, #7, #8, #9 and #21.

PCBs: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMUs #5, #6, #7, #8, and #9.

DRO: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #2, #3, #10, #11 and #21.

Metals: Chromium exceeded the IAO (111µg/kg) in SWMU #2 sample S2-1-0.5 with a reported concentration of 252 milligrams per kilogram (mg/kg).

4.6.2.1.2 ***Intermediate Soils***

A total of 44 intermediate depth soil samples were collected from 43 borings in this area. Intermediate soil samples were not collected beneath SWMU #6 or SWMU #21. Intermediate soil samples were collected and submitted for analysis of VOCs. Additionally, the samples from SWMU #10 were submitted for SVOC analysis. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: There were five VOCs with concentrations that exceeded IAOs. PCE was detected above the IAO (121 µg/kg) in all 17 samples, with the highest concentration of 848,000 µg/kg detected in sample S10-1-10.

SVOCs: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #10.

4.6.2.1.3 ***Deep Soils***

A total of 86 deep soil samples from 45 borings were collected from deep soils in the 10 SWMUs and AOC#11. Deep soil samples were collected and submitted for a combination of VOCs, SVOCs, DRO, and metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Five VOCs were detected above the IAOs in samples collected from 15 ft to 18.5 ft bgs. PCE was detected above the IAO in all 28 samples and was the predominant COC in this area. The highest concentration of PCE (15,700 µg/kg) detected in the sample split at the soil-groundwater interface, S10-1-15, which was collected at 15 ft bgs in SWMU #10.

SVOCs: There were no exceedances of the IAOs for samples collected in the deeper soils in SWMU #3 and #10.

DRO: There were no exceedances of the IAOs for samples collected in the deeper soils in SWMU #2, #3, #10, and #11.

Metals: There were no exceedances of the IAOs for samples collected in the deeper soils in SWMU #11.

4.6.2.2 BUILDING B AND FORMER PAINT CAN PIT (SWMU #16 AND SWMU-#20)

SWMU #16 (Building B) and SWMU #20 (Former Paint Can Pit) are small and immediately adjacent to each other. Therefore, the results of these two SWMUs are discussed together. Analyte detections above IAOs in SWMU #16 and #20 are discussed below.

4.6.2.2.1 ***Shallow Soils***

During the Phase IV RFI a total of 11 shallow soil samples were collected from six borings. Shallow soil samples collected in SWMU #16 were submitted for analysis of VOCs, SVOCs, herbicides, pesticides, PCBs, DRO, and metals. Shallow soil samples collected in SWMU #20 were submitted for analysis of VOCs and metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE was the only VOC detected above the IAO (121 µg/kg) in both shallow soil samples collected from boring BC-2. PCE was detected in samples BC2-0.5 and BC2-2 at 20,300 µg/kg and 495 µg/kg, respectively.

SVOCs: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #16.

Herbicides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #16.

Pesticides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #16.

PCB: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #16.

DRO: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #16.

Metals: Chromium was detected in one sample above the IAO at a concentration of 175 mg/kg (BC-4-0.5)

4.6.2.2.2 ***Intermediate Soils***

A total of four intermediate samples were collected from four borings and submitted for analysis of VOCs and metals. There were no exceedances of the IAOs for either VOCs or metals in samples collected from intermediate soils.

4.6.2.2.3 ***Deep Soils***

A total of eight deep soil samples from four borings were collected and submitted for VOCs and metals analysis. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Six VOCs were detected at concentrations above their IAOs in deep soil samples from SWMU #20. Concentrations of 1,2,4-TMB and 1,3,5-TMB were 1,230,000 µg/kg and 330,000 µg/kg, respectively and naphthalene was detected at a concentration of 179,000 µg/kg. Other compounds exceeding the IAOs are ethyl benzene (98,700 µg/kg), n-butylbenzene (102,000 µg/kg), and n-propylbenzene (262,000 µg/kg).

Metals: There were no exceedances of the IAOs for samples collected in the deeper soils beneath SWMU #16 and SWMU #20.

4.6.2.3 PARKING AREA WEST OF BUILDING A (AOC#8)

During the Phase IV RFI a single boring was advanced and samples were collected from shallow, intermediate, and deep soils to 17 ft bgs in AOC#8. These sample were submitted for analysis of VOCs. No VOCs were present at concentrations exceeding IAOs in any of the samples collected from AOC #8.

4.6.3 Eastern Region

- The Eastern Region includes all portions of the Facility to the east of 25th Street. The region includes Buildings I, J, K, the areas to the south and east of Building J, northeast of Building K and includes the following SWMU:

- SWMU #15 Building J.
- SWMU #22 Former Still Area – southwest corner of Building I.
- AOC#10 Northeastern corner of the facility.
- AOC#12 Area of elevated radium- northwest of Building I.
- Area North of Building J, and
- Area South of Building J

The VOC detections above the IAOs in the Eastern Region are present in seven separate smaller source areas: one along the western side of Building I(SWMU #22 and AOC#12) , a second source area north of Building J, two source areas beneath Building J (SWMU #15), a fifth to the southeast of Building J, a sixth to

the east of Building J (AOC#10), and a seventh source area northeast of Building K in the northeastern corner of the property (AOC#10). Impacts to the shallow soil of each of these areas are discussed below.

4.6.3.1 BUILDING I AND AREAS WEST (SWMU #25, SWMU #22 AND AOC#12)

SWMU #22, SWMU #25 and AOC#12 are immediately adjacent to each other. Therefore, the analytical results of soil sampling in these three SWMUs including analyte detections above IAOs are discussed below:

4.6.3.1.1 ***Shallow Soils***

During the Phase IV RFI a total of 50 shallow soil samples were collected from 14 borings. Shallow soil samples were collected for VOCs and radio chemistry in SWMU #22 and AOC#12. Shallow soil samples were collected for VOCs, SVOCs and metals in SWMU #25 and AOC#12. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: Ten VOCs were detected at concentrations exceeding IAOs in shallow soil samples from this area. 1,2,4-TMB was detected above the IAO in all seven samples. The highest concentration of 1,2,4-TMB was 34,400 µg/kg in A12-3-2. Other compounds exceeding IAOs include naphthalene, PCE, cis-1,2-DCE, TCE, VC, ethyl benzene, toluene, naphthalene, 1,3,5-TMB and 4-Methyl-2-Pentanone. No VOCs exceeded the IAOs were reported in samples collected from SWMU #25.

SVOCs: There were no exceedances of the IAOs for samples collected in the shallow soils.

Metals: There were no exceedances of the IAOs for samples collected in the shallow soils.

Radio Chemistry: There were no radium concentrations that exceed background levels.

4.6.3.1.2 ***Intermediate Soils***

Ten intermediate depth soil samples were collected from eight borings and submitted for VOC analysis. There were no exceedances of the IAOs in samples collected in SWMU #22 and SWMU #25. A summary of the exceedances of the IAOs from AOC#12 is presented in Table 5 and discussed below.

VOCs: Ten VOCs were detected above the IAOs in samples collected in AOC#12. The highest concentrations of 1,2,4-TMB and 1,3,5-TMB in boring A12-3-10 were 107,000 µg /kg and 51,300 µg /kg, respectively. Toluene was reported at a concentration of 1,130,000 µg /kg and PCE and TCE were reported at 277,000 µg /kg and 28,200 µg /kg, respectively. Other VOCs exceeding the IAOs include ethyl benzene, cis-1,2-DCE, naphthalene, O-xylene, and Styrene.

4.6.3.1.3 ***Deep Soils***

A total of 22 deep soil samples were collected and submitted for analysis of VOCs only, with the exception of radio chemistry samples collected beneath AOC#12. There were no VOC exceedances of the IAOs in samples collected in SWMU #22 and SWMU #25. A summary of the exceedances of the IAOS for VOCs in samples collected from AOC#12 is presented in Table 5 and discussed below.

VOCs: 1,2,4-TMB was detected at concentration of 1,950 µg /kg above the IAOs of 1,070 µg /kg in the sample collected from A12-7-15.

4.6.3.1.4 ***Saturated Soils***

One sample was collected from transect location T- 4 at 20 ft bgs and submitted for analysis of VOCs. Vinyl chloride was detected in this sample at a concentration of 59.9 µg/kg, exceeding the IAO of 20.5 µg/kg. This sample was collected from the saturated zone and the vinyl chloride detected in the sample is likely the result of dissolved phase transport from other upgradient areas.

4.6.3.2 BUILDING J (SWMU #15)

The results of the samples collected from SWMU #15 are discussed below.

4.6.3.2.1 ***Shallow Soils***

Shallow soil samples collected in SWMU #15 were submitted for analysis of VOCs, SVOCs, Metals, Herbicides, Pesticides, PCBs and DRO. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE was detected above the IAO in the samples collected from JC-5 and JC-9. The highest PCE concentration is associated with sample JC-5-5 and was reported as 1,710 µg /kg.

SVOCs: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

Herbicides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

Pesticides: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

PCB: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

DRO: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

Metals: There were no exceedances of the IAOs for samples collected in the shallow soils in SWMU #15.

4.6.3.2.2 ***Intermediate Soils***

Eleven intermediate depth soil samples were collected from seven borings in SWMU #15. Intermediate soil samples were submitted for analysis of VOCs only. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE was detected above the IAO in six samples. The highest concentration was 537 µg /kg in the sample split from JC-3-10.

4.6.3.2.3 ***Deep Soils***

Seven deep soil samples were collected from seven borings. No constituents were detected above IAOs in the samples collected from deep soils.

4.6.3.3 NORTH BUILDING J

Analyte detections above IAOs in samples collected in the area north of Building J along the railroad spur are discussed below.

4.6.3.3.1 ***Shallow Soils***

A total of six shallow soil samples were collected from four borings completed in the area north of Building J and submitted for VOC analysis. Several VOCs were detected above the IAOs in the shallow soil samples collected from NBJ-1; however, due to laboratory QC issues, during the validation process the data was flagged as estimated only. During subsequent field events in February, additional borings were advanced to provide additional delineation of the impacts present at NBJ-1. The analytical results obtained during the February 2014 sampling event were all below IAOs.

4.6.3.3.2 ***Intermediate Soils***

A total of four intermediate depth samples were collected from four borings and submitted for analysis of VOCs. No constituents were detected above the IAOs.

4.6.3.3.3 ***Deep Soils***

A total of seven samples were collected from deeper soils at 15 ft bgs to 20 ft bgs in four borings. No constituents were detected above the IAOs.

4.6.3.4 SOUTH OF BUILDING J

Analyte detections above IAOs in SWMU #18 are discussed below.

4.6.3.4.1 ***Shallow Soils***

A total of 16 shallow soil samples were collected from 10 borings in area south of Building J and submitted for VOC analysis. There were no constituents above the IAOs for VOCs in the shallow soils south of Building J.

4.6.3.4.2 ***Intermediate Soils***

Fourteen samples were collected from intermediate soils in the 14 borings south of Building J. Intermediate soil samples collected were submitted for analysis of VOCs only. Soil analytical data for compounds present at concentrations exceeding the IAOs are summarized in Table 5 and discussed below.

VOCs: PCE was detected above the IAO (121 µg/kg) in six samples. The highest concentration of PCE detected is 240 µg /kg in the sample collected from SEBJ-4-10.

4.6.3.4.3 ***Deep Soils***

A total of 29 deep soil samples were collected from 14 borings and submitted for VOC analysis. PCE was detected above the IAO (121 µg/kg) in 10 samples collected from 15 to 20 ft bgs in the area south of Building J. The highest concentration is 121 µg /kg and is associated with SEBJ-5-15.

4.6.3.5 EAST OF BUILDING J (AOC #10)

Analyte detections above IAOs in the portion of AOC#10 located east of Building J are discussed below.

4.6.3.5.1 ***Shallow Soils***

Twenty shallow soil samples were collected from 11 borings and submitted for analysis of VOCs and metals. Soil analytical data for compounds present at concentrations exceeding the IAOs for these SWMUs are summarized in Table 5 and discussed below.

VOCs: PCE and TCE exceeded their IAOs in eight samples collected from six borings. PCE exceeded the IAO in seven samples at concentrations ranging from 137 µk/kg to 557 µg/kg. TCE exceeded the IAO with a reported concentration of 175 µg/kg in the sample collected from boring A10-1-5.

Metals: There were no exceedances of the IAOs for samples collected in the shallow soils in AOC#10 east of Building J.

4.6.3.5.2 ***Intermediate Soils***

Fourteen intermediate soil samples were collected from 13 borings and submitted for VOC and metals analysis. There were no exceedances of the IAOs for VOCs or metals in the intermediate soils.

4.6.3.5.3 ***Deep Soils***

Nine deep soil samples were collected from seven borings and submitted for VOC and metals analysis. There were no exceedances of the IAOs for VOCs or metals in deep soil samples collected in AOC#10 east of Building I.

4.6.3.6 AOC#10 - NORTHEASTERN CORNER

Analyte detections above IAOs in AOC#10, are discussed below.

4.6.3.6.1 ***Shallow Soils***

A total of 38 shallow soil samples were collected from 17 borings in AOC#10 in the northeastern corner of the Site. Shallow soil samples collected in this area were submitted for analysis of VOCs and metals. Soil analytical data for compounds present at concentrations exceeding the IAOs are summarized in Table 5 and discussed below.

VOCs: PCE exceeded the IAO (121 µg/kg) in five samples collected from four borings. The highest concentration was 10,000 µg /kg detected in the sample collected from A10-4-5.

Metals: Both chromium and lead were detected above their IAO (111 mg/kg and 1000 mg/kg respectively) in five samples. The highest chromium concentration of 197 mg/kg was detected in A10-2-0.5. The highest lead concentration of 4,970 mg/kg was detected in A10-4-5.

4.6.3.6.2 ***Intermediate Soils***

Fourteen intermediate depth samples were collected from 13 borings in AOC#10. Intermediate soil samples collected were submitted for analysis of VOCs and metals. Analyte detections above IAOs in AOC#10, are discussed below.

VOCs: PCE exceeded the IAO (121 mg/kg) in the sample collected from borings A10-4-10 and A10-12-10 with reported concentrations of 2,480 µg /kg and 134 µg/kg respectively.

Metals: There were no exceedances of the IAOs for metals in samples collected from intermediate depths.

4.6.3.6.3 ***Deep Soils***

Twenty-two deep soil samples were collected from 12 borings and submitted for VOC and metals analysis. Analyte detections above IAOs are summarized in Table 5 and are discussed below.

VOCs: There were two samples with concentrations exceeding the IAO (121 µg/kg) for PCE. PCE was detected above the IAO in the sample collected from A10-2-17 and A10-2-INT at concentrations of 289 µg /kg and 125 µg/kg respectively.

Metals: Lead was detected above the IAO (1,000 mg/kg) at a concentration of 1,710 mg /kg in the sample collected from A10-4-15.

4.6.3.7 NON-SWMU OR OAC AREAS

The Phase IV RFI included collection of samples from areas not associated with SWMUs OACs. Multiple sampling transects were installed to develop lithologic cross sections and samples were collected from these borings. One soil sample was collected along transect 8 along New York Avenue in the area southeast of the Facility and the northeastern portion of the former El Paso refinery. The sample was collected from the saturated soils at 22 ft bgs and submitted for VOC analysis. Analytical data for this sample is presented in the summary tables in Appendix B. Detections over the IAOs for the sample collected from boring T8-1D-22 are discussed below:

4.6.3.7.1 ***Transect T8***

VOCs: 1,2,4-TMB (65,700 µg /kg), 1,3,5-TMB (19,600 µg /kg), and Naphthalene (5,210 µg/kg) were reported at concentrations above their respective IAOs west of Chisholm Creek. This sample was collected from the saturated zone and is likely the result of dissolved phase transport from other upgradient areas.

4.7 GEOTECHNICAL RESULTS

Geotechnical analyses were performed on fourteen soil samples. The geotechnical tests included soil classification, wet and dry bulk density, moisture content, specific gravity, and total porosity. Due to a laboratory error, five samples were analyzed for electrical conductivity rather than hydraulic conductivity. A summary of the geotechnical results are presented on Table 6.

Geotechnical data will be used at a future date to support evaluation of site remedies and potential future contaminant fate and transport modeling. Therefore, minimal evaluation of this data has been performed for this report. Of note, soil classification results were similar to logs performed in the field during advancement

of the soil borings. This data supports, the interpretation presented in the lithologic logs presented in Appendix A.

4.8 GROUNDWATER ANALYTICAL RESULTS

Section 4.8 discusses results of groundwater sampling, laboratory analysis, and identifies exceedances of applicable regulatory limits in groundwater samples collected during the Phase IV RFI and the October 2013 semi-annual groundwater sampling event. Data from all groundwater samples were compared to the most recent (March 2014) KDHE Tier 2 Risk-Based Residential Scenario groundwater screening levels. If no KDHE residential groundwater value was available, USEPA MCL concentrations were used for comparison purposes. A summary of all data exceeding these groundwater screening levels (GSLs) is presented in Table 7. All groundwater analytical results are presented in Table B-30 of Appendix B.

As stated previously, the facility has been divided into three Regions (Western, Central, and Eastern) for purposes of presenting the results of the groundwater field investigation. Figure 13 depicts the different Regions of the facility. Where appropriate, the Eastern Region includes offsite samples collected between the facility boundaries and Chisholm Creek. Within each Region, the results of the Phase IV field investigation and the October 2013 semi-annual groundwater sampling event have also been divided into two zones: upper zone groundwater and lower zone groundwater.

4.8.1 Constituents of Concern (COC)

Constituents of Concern (COCs) are defined as VOC and metal parameters that were detected in groundwater at concentrations above the GSLs (Table 7). Organic constituents and metals detected above the applicable GSLs include 10 VOCs and five metals. The individual VOC and metal parameters are as follows:

COCs in Groundwater

VOC's	Metals
1,1-Dichloroethane	Arsenic (Total)
1,1-Dichloroethene	Barium (Total)
1,2,4-Trimethylbenzene	Chromium (Total)
1,3,5-Trimethylbenzene	Lead (Total)
Cis-1,2-Dichloroethene	Manganese (Total)
Ethylbenzene	
Naphthalene	

Tetrachloroethene

Trichloroethene

Vinyl Chloride

4.8.2 Volatile Organic Compounds (VOCs) in Upper Zone Groundwater

Thirty one individual VOC compounds were detected in the groundwater samples collected in the upper zone during the investigation. Individual VOCs detected in upper zone groundwater samples at concentrations above the GSLs include PCE, TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, Ethylbenzene, 1,2,4-TMB 1,3,5-TMB, Naphthalene, and VC. A summary of all upper zone groundwater VOC exceedance results is presented in Table 7, and all groundwater VOC analytical results are presented in Table B-30 of Appendix B. A summary of the primary VOC compounds detected in upper zone groundwater is presented below.

4.8.2.1 Tetrachloroethene (PCE) in Upper Zone Groundwater

PCE was detected at concentrations exceeding the GSL of 5 µg/L in 37 samples collected from upper zone groundwater. PCE was detected above the GSL in all three Regions (Western, Central and Eastern), as well downgradient of the site. PCE was not detected in any upper zone groundwater samples collected upgradient of the site.

The two highest concentrations of PCE detected above the GSL in the Western Region were at 153 µg/L in SK-B92, and at 152 µg/L in S18-1. These two sample locations are located within the area of the former Island. The highest onsite concentration of PCE was detected in the Central Region, at 448µg/L in SK-2S, located on the southeast edge of Building B. The highest concentrations of PCE detected above the GSL in the Eastern Region was 281µg/L in SEBJ-3, located southeast of SMWU #15, and 219 µg/L in boring SEBJ-1, located south of SMWU #15.

PCE was detected above the GSL in two downgradient upper zone groundwater samples, at 158 µg/L in T8-3, and at 14.2 µg/L in T8-4, both located east of the facility boundary.

4.8.2.2 Trichloroethene (TCE) in Upper Zone Groundwater

TCE was detected at concentrations exceeding the GSL of 5 µg/L in 39 samples collected from the upper zone groundwater. TCE was detected above the applicable GSL in all three Regions (Western, Central, and Eastern), as well as downgradient of the site. TCE was not detected in any upper zone groundwater samples collected upgradient of the site.

The highest concentration of TCE detected above the GSL in the Western Region was 95.9 µg/L in S18-1, located east of the former Island. The highest onsite concentration of TCE was detected in the Central Region, at 134 µg/L in SK-2S DUP, located on the southeast edge of Building B. The highest concentration of PCE in the Eastern Region was 58.1 µg/L in SEBJ-3, located southeast of SMWU #15.

TCE was detected above the GSL in several downgradient upper zone groundwater samples, most notably at a concentration of 30.3 µg/L in T8-3, located east of the site, and at a concentration of 26.4 µg/L in T8-0, located southeast of the site.

4.8.2.3 CIS-1,2-DICHLORETHENE (CIS-1,2-DCE) IN UPPER ZONE GROUNDWATER

Cis-1,2-DCE was detected at concentrations exceeding the GSL of 70 µg/L in 12 samples collected from upper zone groundwater. Cis-1,2-DCE was detected above the GSL in two Regions (Central and Eastern), as well as downgradient of the site. Cis-1,2-DCE was not detected in any upper zone groundwater samples collected upgradient of the site.

Two of the highest concentrations of cis-1,2-DCE above the GSL were detected within the Central Region of the facility, at 1,710 µg/L in DC-3, located in SWMU #7, and at 403 µg/L in S11-2, located in SMWU #11. The third highest concentration of cis-1,2-DCE was detected in the Eastern Region of the facility, at 436 µg/L in SEBJ-3, located southeast of SWMU #15.

Cis-1,2-DCE was detected above the GSL in two downgradient upper zone groundwater samples, at 273 µg/L in T8-1, located southeast of the site, and at 95 µg/L in T8-3, located east of the site.

4.8.2.4 VINYL CHLORIDE (VC) IN UPPER ZONE GROUNDWATER

Vinyl Chloride (VC) was detected at concentrations exceeding the GSL of 2 µg/L in 13 samples collected from upper zone groundwater. VC was detected above the GSL in two Regions (Central and Eastern), as well as downgradient of the site. VC was not detected in any upper zone groundwater samples collected upgradient of the site.

One of the highest concentrations of VC above the GSL was detected in the Central Region of the facility, at 102 µg/L in S11-2, located within SWMU #11. VC concentrations also exceeded the GSL in the Eastern Region of the facility, the highest concentration detected at 14.2 µg/L in T7-2, located southeast of Building K.

VC was detected above the GSL in two downgradient upper zone groundwater samples, T8-0 and T8-1, both located along the southeastern boundary of the facility, with the highest downgradient VC concentration detected at 109 µg/L in T8-1DUP.

4.8.3 Semi-Volatile Organic Compounds (SVOCs) in Upper Zone Groundwater

Upper zone groundwater samples for SVOC analysis were collected from 13 borings, with SVOCs detected in three of the 13 samples collected. However, none of the three detected concentrations of SVOCs were above the GSLs. All groundwater SVOC analytical results are presented in Table B-30 of Appendix B.

4.8.4 Diesel-Range Organic Compounds (DROs) in Upper Zone Groundwater

Upper zone groundwater samples were collected from a total of five borings for DRO analysis. Concentrations of DROs were detected in three of the five borings sampled, with all detections located in the Central Region of the facility, all within SMWU #11. DROs were detected in samples S11-1, S11-2, and

S11-3, at concentrations of 0.501 mg/L, 0.505 mg/L, and 0.668 mg/L, respectively. DRO analytical results are presented in Table B-30 of Appendix B.

4.8.5 Metals in Upper Zone Groundwater

A total of 23 upper zone groundwater samples were collected for total and dissolved metals analysis. Eleven (11) distinct metals compounds were detected in the 23 samples collected, with five metals detected in one or more samples above the GSLs. Individual metals detected in upper zone groundwater samples at concentrations above GSLs include total arsenic, barium, chromium, lead and manganese. A summary of all upper zone groundwater metal exceedances results is presented in Table 7. All groundwater metal analytical results are provided in Table B-30 of Appendix B.

Three metals accounted for 61% of the reported detections, including:

- Total Barium: one detection, above the GSL of 2,000 µg/L, at 3,540 µg/L in A10-4 (located in the Eastern Region, east of Building K).
- Total Chromium: eleven detections, three above the GSL of 100 µg/L, ranging up to 343 µg/L in A10-4 (located in the Eastern Region, east of Building K).
- Total Lead: fourteen detections, ten above the GSL of 15 µg/L, ranging up to 762 µg/L in A10-4 (located in the Eastern Region of the facility, east of Building K).

The remaining metals detections consisted of the following eight total metals:

- Total Arsenic: seven detections, all above the GSL of 10 µg/L, ranging up to 105 µg/L in A10-4 (located in the Eastern Region, east of Building K).
- Total Calcium: four detections, no applicable limit.
- Total Iron: three detections, no applicable limit.
- Total Magnesium: four detections, no applicable limit.
- Total Manganese: three detections, all above the GSL of 50 µg/L, ranging up to 16,100 µg/L in A10-4 (located in the Eastern Region, east of Building K).
- Total Mercury: one detection, below the GSL of 2 µg/L.
- Total Potassium: two detections, no applicable limit.
- Total Sodium: three detections, no applicable limit.

4.8.6 General Chemistry in Upper Zone Groundwater

A total of four upper zone groundwater samples were collected for General Chemistry analysis, including Carbonate Alkalinity, Bicarbonate Alkalinity, Total Alkalinity, Total and Dissolved Chloride, Fluoride, Hardness, Nitrate-N and Nitrite-N, pH, Total and Dissolved Sulfate, Sulfide, Total Dissolved Solids, Total Organic Carbon, Total Solids, and Total Suspended Solids. None of the analytical results for any of the four samples were above any of the applicable KDHE/USEPA MCL. The analytical methods and results of the General Chemistry analyses are provided in Table B-30 of Appendix B.

4.8.7 Lower Zone Groundwater VOC Results

Two individual VOC compounds (TCE and Naphthalene) were detected in the lower zone groundwater samples at concentrations above the applicable KDHE/USEPA MCL. A summary of lower zone groundwater VOC exceedance results is presented in Table 7, and all groundwater VOC analytical results are presented in Table B-30 of Appendix B.

4.8.7.1 TRICHLOROETHENE (TCE) IN LOWER ZONE GROUNDWATER

TCE was detected at concentrations exceeding the GSL of 5 µg/L in all 16 lower zone groundwater samples. TCE was detected above the GSL in all three Regions (Western, Central, and Eastern), as well as upgradient and downgradient of the site.

The highest onsite lower zone TCE concentration was detected in the Eastern Region at 146 µg/L in RSC-1, located southeast of AOC #12. TCE was detected above the GSL in four of the five upgradient samples collected from lower zone groundwater, with the highest concentration detected at 132 µg/L in SK-8D, located north of AOC#12. TCE was detected above the GSL in the two downgradient lower zone groundwater samples, at 63.2 µg/L and 98 µg/L in T8-1D and T8-2D, respectively, both located southeast of the site.

5 EXTENT OF SITE IMPACTS

This section discusses all environmental data collected during RFI Phases I - IV and routine semi-annual groundwater monitoring events. These data have been used to define the extent of impacts across the site and form the basis of the excavation IRM for the site. An IMWP was conditionally approved in May 2014, finalized in July 2014, and is currently being implemented at the site.

5.1 Soil

5.1.1 Constituents of Concern (COC)

Constituents of concern were identified by comparing analytical results for detected compounds to IAOs. Organic constituents and metals detected above the IAO include 19 VOCs, one SVOC, and three metals. The individual VOC's, SVOC and metals are as follows:

COC's in Soil

1,1,1-Trichloroethane	Ethylbenzene	Toluene
1,1-Dichloroethane	Methylene Chloride	Trichloroethene
1,1-Dichloroethene	Naphthalene	Vinyl Chloride
1,2,4-Trimethylbenzene	N-Butylbenzene	Aniline
1,3,5-Trimethylbenzene	N-Propylbenzene	Arsenic (Total)
1,4-Dioxane	O-Xylene	Chromium (Total)
4-Methyl-2-Pentanone	Styrene	Lead (Total)
Cis-1,2-Dichloroethene	Tetrachloroethene	

5.1.2 Delineation of Extent of Impacted Soil

Figure 14 presents the lateral distribution of VOCs in soil at concentrations exceeding IAOs. Areas where metals concentrations exceeded their IAO's were largely located within the areas where VOC exceedances occurred. Aniline was the only SVOC present above the IAO. It was detected in shallow soils (0.5 ft bgs and two ft bgs) in samples collected in Building D. The IRM currently being implemented at the Site has been designed to remove soil containing VOCs present at concentrations above IAOs. This interim action will also address co-located metal and SVOCs impacts. Figure 14 depicts the vertical and horizontal extent of VOC above their IAOs.

5.1.2.1 VOLATILE ORGANIC COMPOUNDS (VOCs) IN SOIL

Analytical results of all VOC data including mobile lab data collected during the Phase IV RFI are presented by SWMU in Appendix B. Data from the Phase I – III RFIs were previously presented in the Phase I – III RFI reports.

A total of eleven discreet VOC source areas in the three regions were identified from analytical data. These source areas are as follows and discussed below.

Western Region: Building C, Trailer Parking Area and Southwest Fenceline Area.

Central Region: Building D (including southern extension into the northern portion of Building B) and West of Building B (Former Paint Pit).

Eastern Region: West of Building I (Former Still Area), North of Building J, Building J, South of Building J, East of Building J and Northeastern Corner.

5.1.2.1.1 ***Western Region***

The VOC detections above IAOs in the Western Region are present in three separate smaller source areas: one in Building C and the surrounding area (SWMUs #13, #14, #17, and #24), the second in the trailer parking area, and the third at the southwest fence line (SWMU #18).

1) Building C and Surrounding Area (SWMUs #13, #14, #17, and #24): A total of 72 samples were collected from 20 borings to depths of 44 ft bgs to define this source area. Based on these data, it is estimated that the source area is approximately 22,500 sq ft and extends to a depth of 15 ft bgs under Building C and the area to the south. PCE was detected at the highest frequency and at the highest concentrations within this source area. Other compounds present at levels exceeding IAOs include TCE, and cis-1,2-DCE.

2) Trailer Parking Area (SWMU #18): A total of 19 samples collected from 9 borings at depths to 26.5 ft define a source area that is approximately 2,460 sq ft and extends to a depth of 5 ft bgs under the Trailer Parking area. PCE was the only analyte detected at concentrations exceeding its IAO in this area.

3) Southwest Fence Line (SWMU #18): A total of 17 samples collected from 6 borings to a depth of 26.5 ft bgs define a source area that is approximately 2,820 sq ft and extends to a depth of 20 ft bgs near the Southwest Fenceline. PCE was the only analyte detected at concentrations exceeding its IAO in this area.

5.1.2.1.2 ***Central Region***

The VOC detections above IAOs in the Central Region are present in two separate source areas: one in the area west of Building B and the second in Building D (including the Processing Area and the driveway between Building D and Building B).

1) Building D: A total of 201 samples collected from 58 borings define a source area that is approximately 40,000 sq ft and extends to a depth of 15 ft bgs under Building D. PCE was detected at the highest

frequency and at the highest concentrations within the Building D source area. Other compounds present at levels exceeding IAOs include TCE, 1,1-DCE, cis-1,2-DCE, VC, 1,1-DCA, and 1,4-dioxane.

2) West of Building B (Former Paint Pit-SWMU #20): A total of 15 samples collected from 4 borings to a depth of 20 ft bgs define a source area that is approximately 1,180 sq ft and extends to a depth of 15 ft bgs west of Building B. 1,2,4-TMB was detected at the highest frequency and at the highest concentrations within the West of Building B source area. Other compounds present at levels exceeding IAOs include ethyl benzene, naphthalene, n-butylbenzene, n-propylbenzene, and 1,3,5-TMB.

5.1.2.1.3 ***Eastern Region***

The VOC detections above IAOs in the Eastern Region are present in six separate smaller source areas: one along the western side of Building I, a second source area north of Building J, a third at Building J, a fourth to the southeast of Building J, a fifth to the east of Building J, and a sixth source area northeast of Building K in the northeastern corner of the property.

1) West of Building I (Former Still Area): A total of 24 samples collected from 5 borings to a depth of 17 ft bgs define a source area that is approximately 1,250 sq ft and extends to a depth of 15 ft bgs west of Building I. Xylenes were detected at the highest frequency and at the highest concentrations within the West of Building I source area. Other compounds present at levels exceeding IAOs include PCE, TCE, cis-1,2-DCE, vinyl chloride, ethyl benzene, toluene, naphthalene, 1,2,4-TMB, and 1,3,5-TMB.

2) North Building J: A total of 8 samples collected from 3 borings to a depth of 17 ft bgs define a source area that is approximately 300 sq ft and extends to a depth of 15 ft bgs north Building J. Although the data collected during the Phase IV RFI was flagged as estimated only, and not confirmed. Clean Harbors is including the data to delineate the source area as historic data collected in 2005 show detections of VOCs above the IAOs in shallow soils. Cis-1,2-DCE was detected at the highest frequency and at the highest concentrations within the North Building J source area. Other compounds present at levels exceeding IAOs include VC, naphthalene, and 1,2,4-TMB.

3) Building J (SWMU #15): A total of 24 samples collected from 4 borings at depths to 22 ft bgs define a source area that is approximately 1,800 sq ft and extends to a depth of 10 ft bgs beneath Building J. PCE was detected concentrations exceeding its IAOs.

4) South of Building J: A total of 34 samples collected from 12 borings to depths of 20 ft bgs define a source area that is approximately 8,600 sq ft and extends to a depth of 20 ft bgs south of Building J. PCE was detected concentrations exceeding its IAOs.

5) East of Building J (AOC(#10): A total of 22 samples from 8 borings to depths of 20 ft bgs define a source area that is approximately 3,750 sq ft and extends to a depth of 10 ft bgs east of Building J. PCE was detected at the highest frequency and at the highest concentrations within the East of Building J source area. TCE is the only other compounds present at levels exceeding the IAO in this area.

6) Northeastern Corner (AOC#10): A total of 31 samples collected from 10 borings at depths to 20 ft bgs define a source area that is approximately 5,500 sq ft and extends to a depth of 18 ft bgs in the Northeastern Corner of the facility. PCE was detected at the highest frequency and at the highest concentrations within the Northeastern Corner source area. TCE is the only other compounds present at levels exceeding the IAO in this area.

5.1.2.2 METALS IN SOIL

Analytical data from the Phase IV RFI field investigation for metals in soil exceeding their respective IAOs is presented in Table 5 with the exception of Arsenic. Arsenic was not detected at concentrations above the IAO in samples collected during the Phase IV RFI field investigation. Arsenic was, however, detected in historic samples and is considered a constituent of interest at the Facility and included in the discussion below. Arsenic data from historic samples was previously presented in the Phase I – III RFI reports.

1) Arsenic: A total of 276 soil samples have been collected and analyzed for arsenic since 1999. Sample depths ranged from 0.5 ft bgs to 25 ft bgs. Arsenic was not detected above the IAO of 63.2 mg/kg in any samples collected during the Phase IV RFI. However, the sample collected, during a previous RFI, from boring B-66, located in the northwestern corner of the facility at a depth of 0.5 ft, contained an arsenic concentration exceeding the IAO. Therefore, this metal is included as a COC.

2) Chromium: At total of 276 soil samples have been collected and analyzed for total chromium. Sample depths range from 0.5 ft bgs to 25 ft bgs. Of the 276 samples analyzed for chromium, six (A10-2 at 0.5, A10-3 at 2, A10-4 at two ft bgs, S2-1 at 0.5, BC-4 at 0.5 and B-54 at four ft bgs) contained chromium concentrations exceeding the IAO of 111 mg/kg. Four of these samples are located in the northeastern corner of the Facility and will be excavated along with VOC impacted soil as depicted in Figure 14. Soil associated with sample S2-1 at 0.5 ft will similarly be excavated as a part of the Building D excavation. A surface sample in Building B (BC-4 collected at 6 inches bgs) contained 175 mg/kg of chromium at a depth of 0.5 ft bgs. This area is scheduled for excavation and disposal which will remove the chromium from the site. Samples collected at deeper depths in this area did not contain chromium at concentrations exceeding the IAO.

3) Lead: At total of 286 soil samples have been have been collected and analyzed for total lead. Sample depths range from 0.5 ft bgs to 25 ft bgs. Of the 286 samples, six samples exceeded the IAO of 1,000 mg/kg. The six samples exceeding the IAO were collected in two areas of the Facility. One surface sample (B-16 at three ft bgs) contained 1,560 mg/kg of lead at three ft bgs. This area is scheduled for excavation and lead soils will be removed from the site at that time. Samples collected at deeper depths in this area did not contain detectable concentrations of lead. The remaining five samples are located in the northeastern corner of the Facility and will be excavated along with VOC impacted soil as depicted on Figure 14.

5.2 GROUNDWATER

Groundwater COCs (Section 4.8.1) are present beneath the facility due to a combination of regional and site-related sources in both the upper and lower zones. This section summarizes the distribution of groundwater COCs as determined from review of Phase IV RFI and semi-annual groundwater data.

5.2.1 Upper Zone Groundwater

Data collected during the Phase IV RFI and semi-annual monitoring events was evaluated to assess the vertical and lateral distribution of COCs present in the upper zone. VOCs and metals were both detected in upper zone groundwater at concentrations exceeding GSLs. No SVOCs or DRO was detected at concentrations exceeding GSLs. As such, these compounds are not discussed further.

5.2.1.1 VERTICAL DISTRIBUTION OF VOCS IN UPPER ZONE GROUNDWATER

Characterization of the vertical distribution of VOCs in the upper zone was assessed using the following data:

1. Semi-annual groundwater monitoring results from wells SK-1S, SK-2S and SK-12S (October 2013) collected following a three volume purge. These data represent COC concentrations across the entire well screen for each well.

2. Low flow monitoring results from monitoring wells SK-1S, SK-2S and SK-12S (October 2013). Pump intakes for these samples were set within 2 feet of the groundwater elevation and are intended to represent shallow groundwater concentrations within the upper zone.

3. Hydrasleeve samples from monitoring wells SK-1S, SK-2S and SK-12S. Hydrasleeve samplers were deployed in two foot increments from first encountered groundwater to the bottom of each well.

4. Depth-discreet hydropunch samples collected from borings adjacent to monitoring wells SK-1S, SK-2S and SK-12S. Hydropunch samples were collected from temporary borings with a two foot screened interval. Separate borings were installed to collect depth discreet samples in two foot increments across the upper zone.

Depth discreet differences in groundwater concentrations may be present for a variety of reasons including the depth of the source of groundwater contaminants, changes in subsurface lithology, nature of the contaminant released (i.e. dissolved phase or NAPL, surface release or underground tank leak), or distance (vertically or laterally) from the release point. The soil data collected at the Site to date strongly suggests that source of contaminants present in soil at the Site are the result of historic spills to surface soil associated with waste handling activities at the Site. Contaminants released to surface soil have migrated through the surficial clay unit and have at some locations, contacted the groundwater surface and resulted in impacts to groundwater.

Semi-Annual Groundwater Sampling Results

Consistent with the approved SAP, semi-annual groundwater samples are collected following a three volume well purge and subsequent groundwater recovery. The results obtained from this sampling technique are intended to represent concentrations present across the entire well screen and are not depth discreet within the screened interval. A three volume purge is the most disruptive to the aquifer as water is removed from the well using a bailer resulting in surging of the well screen followed by relatively rapid groundwater recovery. Low flow sampling achieves aquifer stabilization by slowly purging stagnant groundwater from a small area of the well screen through pumping at a slow controlled rate with minimal groundwater draw down and minimal disruption to the aquifer. Table 8 presents the results of sampling using both three-volume purge and low flow sampling techniques. As shown in the table, there were no consistent differences in the data collected using these two methods from the three wells included in the study.

Hydrasleeve Sampling Results

A Hydrasleeve is a patented, disposable groundwater sampling device that captures a "core" of groundwater from a discreet interval within a well with minimal disturbances to the static water level. Hydrasleeves were deployed into each of the three wells included in the study to evaluate vertical stratification of COC concentrations and to determine if hydrasleeves could be used in the existing monitoring well network to discern any depth discreet differences in groundwater. The results obtained from Hydrasleeve samples at the Site are presented in Table 8. As shown in the table, very little variation in PCE and TCE concentrations were observed in the Hydrasleeve samples. Hydrasleeve results were consistently lower than results obtained using the standard three-volume purge and generally consistent with the low flow sampling results.

Hydropunch Sampling Results

Groundwater sampling using a hydropunch is accomplished by advancing a direct push drill rod to the desired sampling depth, exposing a length of stainless steel screen and collecting a sample from the drill casing using a low flow pump or bailer. Because a separate boring is installed for each depth interval, the samples obtained from the hydropunch are truly depth discreet. However, differences in hydropunch results from different depths are also necessarily from slightly different locations laterally so the observed differences may be due to either of these factors. Hydropunch results are presented in Table 8. At locations SK-1S and SK-2S, significantly higher PCE and TCE concentrations were observed in shallower groundwater samples than in deep samples. At location SK-12S, the differences were present but were less substantial.

Vertical Distribution Summary

The evaluation of vertical COC distribution in groundwater suggests that higher concentrations of COCs are present at shallower depths, particular in close proximity to overlying soil source areas (wells SK-1S and SK-2S). Both of these wells are located in close proximity to areas where impacted soil extends to groundwater and is providing a continuing source of groundwater contamination. Boring logs for wells and

borings installed in the vicinity of these two wells provide no evidence that the observed differences in groundwater concentrations are due to changes in lithology. Rather, the observed concentration gradients appear to be the result of diffusion from overlying soil sources and are expected to decrease with increasing vertical distance from the source.

The observed differences in groundwater concentrations within SK-12S are less pronounced than in the other two wells. SK-12S is located greater than 100 feet downgradient from the Building C source area, and this lateral distance allows for a greater degree of mixing within the aquifer than for SK-1S and SK-2S, both of which are located within 50 feet of an overlying soil source. Groundwater concentrations in wells located further downgradient are expected to exhibit less depth-dependant variability in groundwater concentrations due to the increased mixing as groundwater moves away from the overlying soil sources.

5.2.1.2 LATERAL DISTRIBUTION OF VOCS IN UPPER ZONE GROUNDWATER

As discussed previously, VOCs, primarily PCE, TCE, cis-1,2-DCE and vinyl chloride, are present in upper zone groundwater from both upgradient and site related sources. The lateral distribution of these VOCs is discussed in this section.

It is important to note that the upper zone groundwater concentrations in the on-site and upgradient wells have remained mostly consistent or have generally slightly decreased in recent years as described in semi-annual groundwater monitoring reports. Total VOC concentrations in wells located both upgradient and downgradient of the facility appear to be generally stable, indicating that the chlorinated solvent plumes are mature and not growing. These findings suggest that the VOC mass is slowly being depleted through advection, dispersion, biodegradation, sorption, and other natural attenuation processes.

Tetrachloroethene (PCE)

PCE is the predominant Site related contaminant in both soil and groundwater at the Facility. Because PCE was not detected in any upgradient upper zone monitoring wells, there is no evidence to suggest that the presence of PCE in groundwater beneath the Site is related to any upgradient sources. Furthermore, historic activities at the Site have included extensive handling and treatment of PCE laden materials.

The distribution of PCE in upper zone groundwater is depicted in Figure 15. As shown in the figure, PCE impacted groundwater is present in the western, central and eastern portions of the facility and also downgradient of the facility adjacent to Chisolm Creek. PCE in the western portion of the facility appears to be associated with soil impacts within and south of Building C. A second PCE plume appears to originate in the vicinity of the Processing Area and Building D. On the eastern portion of the facility, two smaller PCE plumes are depicted that originate from Building J and the northeastern corner of the facility.

Trichloroethene (TCE)

TCE is present in upper zone groundwater due to a combination of upgradient and site related sources. The distribution of TCE in upper zone groundwater is also influenced by the intrinsic biodegradation of PCE to

TCE. The distribution of TCE in upper zone groundwater is depicted in Figure 16. TCE contours are similar to the PCE contours except for the upgradient source of TCE evident on the eastern portion of the property. There is likely some comingling of groundwater plumes originating off-site, with the site related sources near Building J.

Two other TCE sources, one in the central and one in the western portions of the facility are also depicted in the figure. These groundwater plumes are likely the result of groundwater contacting TCE impacted surficial soils beneath Building C, Building D and the Processing Area.

Cis-1,2-Dichloroethene (cis-1,2-DCE)

The inferred extent of cis-1,2-DCE in upper zone groundwater is shown on Figure 17. Cis-1,2-DCE is a daughter product of PCE degradation and is likely present in site groundwater due to in situ degradation of TCE originating both on and upgradient. Cis-1,2-DCE was identified at concentrations exceeding the GSL in the central and eastern portions of the Site. Also depicted on Figure 17 is a more dilute plume in the western portion of the facility where all detected concentrations were below the 70 µg/L GSL.

The cis-1,2-DCE plume on the eastern portion of the Site is present due to a combination of upgradient and site related sources in the vicinity of Building J. Cis-1,2-DCE is also present in the central portion of the Site near Building D and the Processing Area and at well SK-2S south of Building B at concentrations exceeding the GSL. Concentrations of cis-1,2-DCE exceeding the GSL were also present in well SK-11S and sample T8-1 located southeast of the property near Chisolm Creek.

Vinyl Chloride (VC)

Vinyl Chloride was detected at concentrations exceeding the GSL of 2 µg/L in 13 samples collected from the upper zone. As shown in Figure 18, VC was detected above the GSL in both the Central and Eastern Regions, as well as downgradient of the Site adjacent to Chisolm Creek. VC was not detected in any upper zone groundwater samples collected upgradient of the site. Because VC is a breakdown product of higher chlorinated ethenes, it is possible that the presence of VC in groundwater is due to breakdown of these contaminants originating on and up gradient of the Site.

Other VOCs

The most notable detections of other VOCs in upper zone groundwater were observed in the groundwater sample from location T8-1, located southeast of the facility adjacent to Chisolm Creek. Concentrations of m,p-xylenes, ethylbenzene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene exceeded GSLs in this sample but were either not detect or below GSLs at all other on-site or upgradient locations. It is possible that these compounds are related to historic releases at the former El Paso Refinery as sample location T8-1 is located immediately downgradient of the northeastern portion of this property.

5.2.1.3 DISTRIBUTION OF METALS IN UPPER ZONE GROUNDWATER

Concentrations of metals were detected above GSLs in all three Regions (Western, Central, and Eastern), with total arsenic and total lead detected above the GSL in all three Regions, total barium detected above the GSL in the Eastern Region only, total chromium detected in the Central and Eastern Regions, and total manganese detected above the GSL in the Western and Eastern Regions.

5.2.2 Lower Zone Groundwater

As discussed in Section 4.8.2, TCE was the only VOC detected in lower zone groundwater at concentrations exceeding the GSL of 5 µg/L. The distribution of TCE in lower zone groundwater is depicted in Figure 19. As shown in the figure, TCE impacts in the lower zone appear to originate off-site as a part of the regional NIC plume. Some limited site-related contribution to TCE concentrations in the lower zone may present in the central portion of the Site as evidence by a slight increase in TCE concentrations in well SK-2D relative to wells upgradient of the Site. However concentrations at this location are similar to those observed further upgradient and the observed differences may not be site related.

As previously discussed, the clay layer separating the upper and lower groundwater flow zones was not encountered in borings installed in the southwestern portion of the Site. Whereas this clay layer is believed to impede the downward migration of COCs released at the facility over most of the site, its absence in the southwestern corner of the Site allows mixing of upper zone and lower zone groundwater in this area. As a consequence, lower zone COC concentrations in the southwestern portion of the Site likely represent some mixing of upper and lower zone groundwater as evidenced by the slightly elevated TCE concentrations in wells SK-4D and SK-12D over wells located further upgradient.

5.3 AOC #12 RADIOCHEMISTRY CHARACTERIZATION

USA Environment, L.P., was retained by Clean Harbors in 2013 to perform a radiological screening survey of the facility. This screening was conducted in order to confirm and supplement data presented in the Kansas Department of Health and Environment report from a 2010 survey of the same property. Based on their investigation, USA Environmental concluded that the portions of the facility that had been previously linked to low levels of radium contamination do not contain soil concentrations that would require remediation under any state or federal guidelines.

Despite these findings, the Phase IV RFI included collection of samples for radium analysis from both soil and groundwater. Phase IV RFI radium results are discussed below.

5.3.1 Soil Radiochemistry

Additional soil radiological analytical results were obtained on four, off-site background soil samples (BG-1 through BG-4), and on 29, onsite samples collected from within AOC #12, and SWMUs #22 and #24. All 33 of these additional soil samples were collected by Cameron-Cole during the Phase IV RFI investigation. Analytical results of the 29 onsite-samples supported USA Environment's conclusion, with all 29 Radium 226 and 228 results registering at or below the Radium levels detected in the four offsite, background samples.

Table 9 presents the soil radiological analytical results collected by Cameron-Cole, and USA Environment's report, dated September 2013, is provided as Appendix E to this report.

5.3.2 Radiochemistry in Upper Zone Groundwater

Groundwater samples were collected from a total of six borings and/or wells for Radium 226 (E903.1) and Radium 228 (RA05) analysis. Radium 226 was detected in all six samples, at concentrations ranging from 0.6 picocuries per liter (pCi/l) in sample S22-1 to 10 pCi/l in sample MW-18. Radium 228 was detected in five of the six samples, at concentrations ranging from 1.0 pCi/l in sample A12-1 to 2.1 pCi/l in sample S24-2. Sample results are within the range of background values.

5.3.3 Radiochemistry in Lower Zone Groundwater

Two lower zone groundwater samples were collected during the Phase IV RFI for Radium 226 (E903.1) and Radium 228 (RA05) analysis. Radium 226 was detected in both samples, at 0.5 pCi/l in sample A12-1-Clay, and 0.2 pCi/l in sample A12-1-Lower. Radium 228 was detected in one of the samples, at 1.7 pCi/l in sample A12-1-Clay, but was below detection in sample A12-1-Lower.

5.4 Indoor Air Quality

VOCs present in soil and groundwater can migrate into indoor air and affect indoor air quality. Factors that may influence the impacts to indoor air quality include depth to groundwater, the nature of the building floor/foundation, and the concentrations of VOCs detected in the soil and groundwater.

A total of four samples were collected within Building E during the Phase IV RFI. Building E is the administration building where the potential for adverse health effects due to chemicals in indoor air is the greatest due to the activity patterns of the workers present in this building compared to those in other portions of the Site.

Two breathing zone indoor air samples and two sub-slab soil gas samples were collected in Building E to assess the asses the indoor air quality and potential for vapor intrusion. The analytical results are compared to the most recent (March 2014) values of KDHE Residential Indoor Air, March 2014. Table 10 presents the results of all air samples.

Sub-slab sample results were below the KDHE Residential Indoor Air standards for all compounds. Breathing zone air sample results were below the KDHE Residential Indoor Air standards with the exception of the breathing zone air sample collected in the basement of the building. 1,2,4-TMB was detected at a concentration of 18 µg/m3 which is above the standard of 7.3 µg/m3 for this compound. This compound was not detected in either sub-slab samples or at elevated concentrations in the ambient sample collected outside behind Building A. Further evaluation of potential hazards associated with indoor air at the facility is included in the HHRA (Appendix G).

In an attempt to identify the potential source of 1,2,4-TMB detected in the Building E basement sample, all soil and groundwater samples collected within 100 ft. of Building E (in some cases the distance was greater in order to obtain a data point) were evaluated. The following seven points were identified.

1. T6-1 (approximately 130 ft southeast)
2. T5-3 (approximately 35 ft northeast)
3. T5-4 (approximately 100 ft northeast)
4. T4-3 (approximately 40 ft west)
5. T4-2 (approximately 150 ft southwest)
6. T5-2 (approximately 20 ft west)
7. A8-1 (approximately 40 ft northeast)

No 1,2,4-TMB was detected in any soil or groundwater samples from these borings. As such, available data provides no evidence of a source for 1,2,4-TMB within reasonable distances of the building that would contribute to vapor intrusion of 1,2,4-TMB in Building E.

5.5 Risk Assessment

The HHRA and SLERA were conducted by RBR Consulting. The following sections provide a brief summary of the results. The complete reports are included in Appendix E and G.

5.5.1 Human Health Risk Assessment

Potential incremental health risks to site workers, site visitors and recreational users of Chisolm Creek were evaluated in a human health risk assessment conducted by RBR Consulting Inc. Constituents of interest were identified by comparing detected concentrations to conservative health based screening values. Exposure to COIs via direct contact, inhalation and ingestion was estimated using USEPA recommended exposure parameters. The results of the risk assessment indicates that theoretical excess lifetime cancer risks were within the acceptable risk range (1×10^{-6} to 1×10^{-4} for cumulative effects) for all receptors in the all areas of the facility. Hazard indices calculated to evaluate potential adverse non-cancer health effects were below the benchmark value of 1 for all receptor groups. The results of the human health risk assessment also indicated that potential recreational visitors to Chisolm creek were unlikely to suffer adverse health effects or unacceptable incremental cancer risks due to exposure to chemicals present in creek sediment and surface water. A complete copy of the HHRA is included in Appendix G.

5.5.2 Screening Level Ecological Risk Assessment

A screening level ecological risk assessment (SLERA) was conducted to evaluate potential impacts to the aquatic habitats of the East Fork of Chisholm Creek. Surface water, sediment and porewater samples were collected at five distinct locations along Chisholm Creek. In addition, a macroinvertebrate survey was conducted to assess the biotic integrity of the stream.

Sample results were compared to relevant aquatic life criteria to determine the potential for adverse effects to the habitat of Chisolm Creek. Three inorganics (arsenic, barium and lead) and one organic

(acenaphthene) were present in sediments at levels exceeding screening criteria. 1,1,1-TCA was the only organic detected in surface water at concentrations exceeding screening criteria, and only in the sample collected upstream of the facility. The macroinvertebrate survey indicated that conditions at all of the sampling locations were between "non-impaired" and "slightly impaired" habitat quality designations. However, these results did not correlate to detected concentrations of COIs in the creek and none of the observed habitat impairment was determined to be site related. A complete copy of the SLERA is included in Appendix E.

6 SUMMARY AND CONCLUSIONS

The objectives of the Phase IV RFI are to satisfy permit conditions under Section III.E.3 of the Permit, collect subsurface data required for the partial closure of Buildings B, D and J as described in the Closure Plan for Buildings B, D and J, collect additional data requested by KDHE and the USEPA in response to previous RFI submittals, and collect data to be used in evaluation of potential site remedies under the subsequent CMS for the facility. Subsequent to the completion of the Phase IV RFI, Clean Harbors has initiated an interim remedial measure at the Site under approval from USEPA and KDHE.

6.1 SOIL

A total of 892 soil samples were collected across the facility at various depths ranging from the surface to 44 ft bgs. Soil data was indirectly compared to both the USEPA Region 9 RSLs and KDHE Tier 2 non-residential standards through the IAO concentrations that were presented in the Interim Remedial Measure Work Plan.

Organic constituents and metals detected above the IAO include 19 VOCs, one SVOC, and two metals. Although arsenic was not detected above the IAOs in Phase IV RFI samples, it has been detected in historical samples above the IAOs and is considered a constituent of concern.

A total of eleven discreet VOC source areas were identified at the site. These areas are depicted on Figure 14. Clean Harbors is actively addressing these areas through and approved interim remedial measure. The IMWP including a comprehensive soil confirmation sampling plan designed to document that the areas excavated have fully removed VOC and SVOC impacted is currently being finalized.

6.2 GROUNDWATER

A total of 136 groundwater samples were collected from 81 borings and four wells (SK-1S, SK-2S, SK-12S, and MW-18) during the investigation. COCs have been identified in both the upper and lower groundwater zones and the extents of impacts have been defined. Groundwater migrating on site from upgradient sources includes concentrations of chlorinated hydrocarbon compounds and aromatic hydrocarbon compounds.

Impacts to groundwater at the site as a result of historical operations on the facility appear to be largely limited to the upper zone. The vertical migration of constituents from the upper zone to the lower zone is impeded by a clay layer that occurs over much of the site, and by a slight upward vertical gradient.

Individual VOCs detected in groundwater samples at concentrations above GSLs include PCE, TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, ethylbenzene, 1,2,4-TMB 1,3,5-TMB, naphthalene, and VC. Groundwater data suggests that impacted groundwater in the upper zone extends eastward to Chisholm Creek. Groundwater impacts in the lower zone are due primarily to upgradient sources associated with the NIC, with limited evidence of site related impacts.

Vertical COC stratification in the upper zone was most evident in soil borings installed close to identify soil source areas. Data suggests that the observed stratification is most likely related to vertical distance from

the overlying soil source and not due to changes in subsurface lithology. Stratification of groundwater concentrations in the upper zone was less evident in borings installed further downgradient from soil source areas.

The data collected during the Phase IV RFI field investigation was used to address all items required to move forward toward a "YE" status for the Groundwater Environmental Indicator on the CA 750 form.

The Facility is actively addressing soil source areas through an excavation Interim Remediation Measure (IRM). The goal of the IRM is to remove soil containing concentrations of COCs exceeding IAOs. IRM activities will be documented in an IRM completion report to be submitted following completion of the IRM. This report will document residual levels of COCs remaining in soil and will form the basis for the CMS and post excavation risk assessment.

6.3 Air Quality

Ambient air and sub-slab vapor samples were collected to evaluate the potential for adverse effects on the indoor air quality due to subsurface VOC contamination. One compound, 1,2,4-TMB, was detected at a concentration of 18 µg/m3 above the standard of 7.3 µg/m3. Groundwater and soil data did not yield a source for 1,2,4-TMB within reasonable distances of Building E that would contribute to vapor intrusion.

6.4 Chisholm Creek

Data collected during the phase IV RFI were used to perform a SLERA and a HHRA. No unacceptable health risks to recreational users of Chisolm Creek were identified. Further, no site related impacts to habitat quality in the creek were identified.

6.5 Monitoring Well Network

Many of the facility monitoring wells were destroyed in accordance with KDHE regulations prior to initiation of the IRM. Upon completion of the IRM and CMS, recommendations for re-installation of select monitoring wells will be presented.

7 REFERENCES

Cameron-Cole. April 2006 through 2013. Semi Annual Reports.

Cameron-Cole. April 4, 2000. Initial Addendum to Phase I RFI Work Plan.

Cameron-Cole. August 3, 1998. Draft RFI Phase I Work Plan.

Cameron-Cole. August 31, 2001. Revised Phase II Work Plan.

Cameron-Cole. February 24, 1999. Revised USEPA Work Plan.

Cameron-Cole. February 16 and March 30, 2001. Second Addendum to RFI Phase I Work Plan.

Cameron-Cole. February 18, 2002. Draft RFI Phase III Work Plan.

Cameron-Cole, LLC. 2002. RCRA Facility Investigation, Phase III Work Plan.

Cameron-Cole, LLC, 2001. RCRA Facility Investigation, Phase II Work Plan.

EPA Identification No. KSD007246846, Safety-Kleen (Wichita), Inc. Facility, 2549 North New York Avenue, Wichita, Kansas and associated Letter from Cameron-Cole, LLC dated October 15, 2001 amending the scope of work, and USEPA's letter dated November 6, 2001 amending the Revised Phase II RFI Work Plan.

Cameron-Cole. January 20, 2005. RCRA Facility Investigation (RFI) Report – Clean Harbors Kansas LLC, Formerly Safety-Kleen (Wichita), Inc. KSD007246846.

Cameron-Cole. July 18, 2002. Revised Phase III Work Plan.

Cameron-Cole. June 7, 2000. USEPA Response letter.

Cameron-Cole. June 12, 2001. RFI Phase II Work Plan draft.

Cameron-Cole. May 24, 2001. Results of work.

Cameron-Cole. May 28, 2002. Response Letter to USEPA.

Cameron-Cole. November 22, 1999. Modified Work Plan.

Cameron-Cole. October 2000. Well Installation and Sampling.

Cameron-Cole. October 15, 2001. Modified Revised Phase II Work Plan.

Cameron-Cole. July 19 15, 2013. RCRA Facility Investigation (RFI) Supplemental Phase IV Work Plan.

Cameron-Cole. May XX, 2013. Response Letter to USEPA on RCRA Facility Investigation (RFI) Supplemental Phase IV Work Plan.

Cameron-Cole. May 17, 2013. Response Letter to USEPA on RCRA Facility Investigation (RFI) Supplemental Phase IV Work Plan.

Cameron-Cole. July 22, 2013. Response Letter to USEPA on RCRA Facility Investigation (RFI) Supplemental Phase IV Work Plan.

Cameron-Cole. March 20, 2014. Draft RCRA Soil Interim Remedial Measure Work Plan.

CDM. April 10, 2001. Draft – North Industrial Corridor Site March, 2001 Water Level Map and Data, (Memorandum with enclosures from CDM to the City of Wichita and the Kansas Department of Health and Environment.

CDM. August 2002.North Industrial Corridor (NIC) Site Draft Remedial Investigation Report, City of Wichita.

CDM. December 12, 2002. Memorandum from Camp Dresser & McKee (CDM) regarding responses to TAC comments on the Draft Baseline Risk Assessment (BLRA).

CDM. 2002. Draft Baseline Risk Assessment, North Industrial Corridor (NIC) Site, City of Wichita.

CDM 2000. February 2000. City of Wichita, North Industrial Corridor Site, Phase 1/1A Technical Memorandum.

Coastal Refining & Marketing. 1996. Quarterly Progress Report – October 16, 1995 to January 15, 1996, Wichita Refinery, Wichita, Kansas.

Department of Health and Environment Bureau of Environmental Remediation. February 18, 1987. Preliminary Findings - Contamination at 29th and Mead, Wichita, Kansas.

Environmental Decision Group, Inc. 1999. RCRA Facility Investigation, Phase I Work Plan.

EPA Identification No. KSD007246846, Safety-Kleen (Wichita), Inc. Facility, 2549 North New York Avenue, Wichita, Kansas.

GeoMonitoring Services. November 1991. Final Revision: Enhance Recover Report for the Coastal Derby Hydrocarbon Recovery Project at the Wichita, Kansas Refinery.

Groundwater Consultants. January 24, 1994. UIC Permit Application, Wichita Refinery, Wichita, Kansas.

Groundwater Consultants. September 12, 1994. Remediation System Design, Revised Attachments, Wichita Refinery, Wichita, Kansas.

Groundwater Consultants. November 20, 1998. Quarterly Progress Report – July 16, 1998 to October 15, 1998, Wichita Refinery, Wichita, Kansas.

Groundwater Consultants. November 28, 2000. Quarterly Progress Report – April 16, 2000 to July 15, 2000 and Annual Report, Wichita Refinery, Wichita, Kansas.

Groundwater Technology, Inc. August 27, 1991. Draft Remedial Investigation Report for the 29th and Mead RI/FS.

Groundwater Technology, Inc. 1996. Preliminary Results from Investigation of the 29th and Mead Area. Volume 1. Prepared for Wichita North Industrial District. Project No. 040020138.

HWS Technologies. December, 20, 1991. Transmittal letter for a report regarding aquifer testing and report excerpts.

HWS Technologies. September 24, 1990. Groundwater Sampling and Analysis Report.

Lane, C.W. and D.E. Miller. 1965. Geohydrology of Sedgwick County, Kansas. Kansas Geological Survey. Bulletin 176.

Kansas Department of Health and Environment. June 2007. Kansas Vapor Intrusion Guidance, Wichita, Kansas.

Kansas Department of Health and Environment. June 2010. Unified Focused Assessment Report for Safety-Kleen (Wichita) Site (Ried Supply).

Kansas Department of Health and Environment. September1993. Expanded Site Inspection,13th and Washington, Wichita, Kansas.

PRC Environmental Management , Inc., on behalf of the USEPA. September 24, 1990. RCRA Facility Assessment.

PRC. September 24, 1990. Draft Preliminary Assessment Report (RFA).

State of Kansas. March 29, 1995. Corrective Action Permit (Part I).

The Interstate Technology and Regulatory Council Vapor Intrusion Team. January 2007. Vapor Intrusion Pathway: A Practical Guideline.

USEPA. May 1989. Guidance Document, Interim Final RCRA Facility Investigation Guidance, Volumes I-IV.

USEPA, Part II RCRA Hazardous and Solid Waste Amendments (HSWA) Permit, dated December 23, 1994. Identification No. KSD007246846, Safety-Kleen (Wichita), Inc. Facility, 2549 North New York Avenue, Wichita, Kansas.

USEPA. November 19, 1998. Comments on Draft RFI Phase I Work Plan.

USEPA. July 2, 1999. Additional Comments.

USEPA. December 2, 1999. Final Agency Approval of Phase I Modified Work Plan.

USEPA. May 2, 2000. Comments on Initial Addendum to Phase I RFI Work Plan.

USEPA. June 26, 2000. Approval Letter of Initial Addendum to Phase I RFI Work Plan.

USEPA. March 13, 2001.Comments on Second Addendum to RFI Phase I Work Plan.

USEPA. August 3, 2001. Comments on RFI Phase II Work Plan draft.

USEPA. November 6, 2001. Approval of Modified Revised Phase II Work Plan.

USEPA. June 28, 2002. Further comments on Draft RFI Phase III Work Plan.

USEPA. April 18, 2002.Comments on Draft RFI Phase III Work Plan.

USEPA. August 6, 2002. Approval Letter of Revised Phase III Work Plan.

USEPA 240/R-02/005. December 2002. Guidance on Choosing a Sampling Design for Environmental Data Collection.

USEPA. August 27, 2013. Conditional Approval Letter of Phase IV Work Plan.

TABLES

TABLE I
Summary of Previous Investigations
Phase IV RFI Report
Clean Harbors Kansas, LLC

Date	Investigation
February 18, 1987	Preliminary Findings - Contamination at 29th and Mead, Wichita, Kansas, Department of Health and Environment Bureau of Environmental Remediation
September 24, 1990	RCRA Facility Assessment Report, PRC
September 24, 1990	Groundwater Sampling and Analysis, HWS Technologies
December 20, 1990	Transmittal letter for a report regarding aquifer testing and report excerpts, HWS Technologies
August 27, 1991	Volume I, Draft Remedial Investigation Report for the 29th and Mead RI/FS, Groundwater Technology Inc
September 1, 1993	Expanded Site Inspection, 13th and Washington, Wichita Kansas, Kansas Department of Health and Environment
August 27, 1991	Preliminary Results from Investigation of the 29th and Mead Area, Volumes I and II, Revised on June 12, 1992 and June 13, 1996
October 14, 1999	RFI Phase I Work Plan, approved December 2, 1999.
April 4, 2000	Addendum to the RFI Work Plan, approved June 26, 2000.
August 31, 2001	The RFI Phase II Work Plan, approved November 6, 2001.
July 18, 2002	RFI Phase III Work Plan, approved August 6, 2002

TABLE 2
Summary of Historic Sample Locations and Analytical Parameters
Phase IV RFI Report
Clean Harbors Kansas, LLC

SWMU / AOC/ Other Area	Boring ID	RFI Phase	Date Completed	Sample Depth	Soil Analytical Parameters						Groundwater Analytical Parameters
					Metals	SVOC's	VOC's	Pesticides	DRO	BTEX	VOC's
SWMU # 2 Waste Blending and Drum	B-16	I	12/1/1999	1-3 ft	X		X				
	B-17	I	12/1/1999	1-3 ft	X	X	X				
	B-18	I	12/2/1999	1-3 ft	X	X	X				
	B-19	I	12/2/1999	1-3 ft	X	X	X				
		I	12/2/1999	13 ft			X				
	B-20	I	12/2/1999	1-3 ft	X	X	X				
SWMU 4. Process Area Truck Bay		I	12/2/1999	16 ft			X				
SWMU 5. Sparging Room	B-21	I	12/2/1999	1-3 ft	X	X	X				
SWMU 6. Hot Rooms		I	12/2/1999	12 ft			X				
SWMU 7. Elevated Tank Storage Area	B-22	I	12/2/1999	1-3 ft	X		X				
SWMU 21. Cyclone		I	12/2/1999	8 ft			X				
	B-48	II	11/9/2001	3 ft		X	X				X
		II	11/9/2001	14 ft		X	X				
	B-68	II	11/12/2001	4 ft	X	X	X				X
		II	11/12/2001	16 ft	X	X					
SWMU 8. Regulated Waste Storage Area SWMU 9. Solids Dryer	B-23	I	12/2/1999	1-3 ft	X		X				
SWMU 11. Crushed Drum Roll Off Boxes	B-50	II	11/9/2001	4 ft		X	X				X
		II	11/9/2001	15 ft		X					
SWMU 14. Drum Storage Warehouse	B-14	I	12/1/1999	0-4 in	X		X				
	B-15	I	12/1/1999	1-3 ft	X		X				
SWMU 15. Building J (North)	B-30	I	12/1/1999	0-4 in	X		X	X			
		I	12/1/1999	16 ft			X				
	B-31	I	12/1/1999	0-4 in	X		X				
		I	12/1/1999	5 ft	X		X				
	B-31V	III*	1/31/2005	6 ft			X				
	B-60	II	11/9/2001	1 ft	X		X				
		II	11/9/2001	3 ft	X		X				
		II	11/9/2001	16 ft	X		X				
SWMU 15. Building J (South)	B-32	I	11/30/1999	1-3 ft	X		X	X			
	B-33	I	11/30/1999	1-3 ft	X		X	X			
		I	11/30/1999	15 ft			X				
	B-34	I	11/30/1999	1-3 ft	X		X	X			
	B-78	II	11/8/2001	20 ft							X
	B-82	II	11/9/2001	18 ft							X
	B-96	III	8/21/2002	4 ft			X				X
		III	8/21/2002	12 ft			X				
	B-96V	III*	1/31/2005	4 ft			X				
		III*	1/31/2005	14 ft			X				
	B-100	III	8/20/2002	4 ft			X				X
		III	8/20/2002	14.5 ft			X				
	B-100V	III*	1/31/2005	4 ft			X				
		III*	1/31/2005	14 ft			X				
	B-101	III	8/21/2002	8 ft			X				X
		III	8/21/2002	12 ft			X				
	B-102	III	8/21/2002	4 ft			X				X
		III	8/21/2002	14.5 ft			X				
	B-103	III	8/21/2002	8 ft			X				X
		III	8/21/2002	15 ft			X				
	B-103V	III*	1/31/2005	8 ft			X				

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Phase IV RFI Report
Clean Harbors Kansas, LLC

SWMU / AOC/ Other Area	Boring ID	RFI Phase	Date Completed	Sample Depth	Soil Analytical Parameters						Groundwater Analytical Parameters
					Metals	SVOC's	VOC's	Pesticides	DRO	BTEX	VOC's
SWMU 16. Corrosive Waste Storage Area	B-2	I	12/2/1999	0-4 in	X		X				
	B-3	I	12/2/1999	1-3 ft	X		X				
		I	12/2/1999	6 ft			X				
	B-49	II	11/7/2001	4 ft		X	X				
		II	11/7/2001	15 ft		X	X				
SWMU 17. Dry Solids Gondola SWMU 24. Area South of Building C	B-12	I	12/2/1999	1-3 ft	X		X	X			
	B-13	I	12/2/1999	1-3 ft	X		X	X			
		I	12/2/1999	12 ft			X				
	B-45	II	11/8/2001	4 ft			X				X
		II	11/8/2001	14 ft			X				
	B-46	II	11/8/2001	2 ft			X				X
		II	11/8/2001	13 ft			X				
	B-47	II	11/8/2001	3 ft			X				X
		II	11/8/2001	14 ft			X				
	B-84	III	8/20/2002	4 ft			X				X
		III	8/20/2002	11.5 ft			X				
	B-85	III	8/20/2002	3.5 ft			X				X
		III	8/20/2002	10 ft			X				
	B-86	III	8/20/2002	3.5 ft			X				X
		III	8/20/2002	11 ft			X				
	B-86V	III*	1/31/2005	3.5 ft			X				
		III*	1/31/2005	12 ft			X				
	B-105	III	8/22/2002	4 ft			X				X
		III	8/22/2002	11 ft			X				
	B-110	III*	1/31/2005	0.5 ft			X				
		III*	1/31/2005	3 ft			X				
		III*	1/31/2005	13 ft			X				
	B-111	III*	1/31/2005	0.5 ft			X				
		III*	1/31/2005	3 ft			X				
		III*	1/31/2005	15 ft			X				
SWMU 18. Open Area Along SW Corner	B-5	I	12/1/1999	0-4 in	X	X	X			X	
	B-6	I	12/1/1999	0-4 in	X	X	X				
	B-7	I	12/1/1999	0-4 in	X	X	X				
	B-8	I	12/1/1999	0-4 in	X	X	X				
	B-9	I	12/2/1999	0-4 in	X	X	X				
	B-10	I	12/2/1999	0-4 in	X	X	X				
	B-11	I	12/1/1999	0-4 in	X	X	X				
	B-43	I	12/1/1999	0-4 in	X	X	X				
	B-56	II	11/9/2001	3 ft			X				X
		II	11/9/2001	16 ft			X				
	B-57	II	11/7/2001	4 ft			X				
		II	11/7/2001	15 ft			X				
	B-58	II	11/7/2001	4 ft			X				
		II	11/7/2001	16 ft			X				
	B-76	II	11/8/2001	4 ft			X				
		II	11/8/2001	16 ft			X				
	B-87	III	10/20/2003	8 ft			X				
		III	10/20/2003	11.5 ft			X				
	B-88	III	10/20/2003	4 ft			X				
		III	10/20/2003	10 ft			X				
	B-89	III	10/20/2003	4 ft			X				
		III	10/20/2003	9 ft			X				
	B-90	II	8/20/2002	11 ft			X				X
	B-91	II	8/20/2002	8 ft			X				X
	B-98	II	8/20/2002	0.5 ft			X				
		II	8/20/2002	12 ft			X				X
	B-59	II	11/12/2001	3 ft			X				X
		II	11/12/2001	15 ft			X				X
	B-60	II	11/9/2001	1, 3,	X		X				X
		II	11/9/2001	3 ft	X		X				X
		II	11/9/2001	16 ft	X		X				X
	B-69	II	11/12/2001	3 ft	X		X				X
		II	11/12/2001	15 ft	X		X				X
	B-77	II	11/12/2001	5 ft			X				X
		II	11/12/2001	16 ft			X				X
	B-104	III	8/22/2002	4 ft			X				X

TABLE 2
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Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

SWMU / AOC/ Other Area	Boring ID	RFI Phase	Date Completed	Sample Depth	Soil Analytical Parameters						Groundwater Analytical Parameters
					Metals	SVOC's	VOC's	Pesticides	DRO	BTEX	VOC's
SWMU 18. Open Area Along SW Corner		III	8/22/2002	11.5 ft			X				
	B-106	III	8/22/2002	4 ft			X				X
		III	8/22/2002	11 ft			X				
	B-106V*	III*	1/31/2005	4 ft			X				
		III*	1/31/2005	13 ft			X				
	B-107	III	10/20/2003	4 ft			X				
		III	10/20/2003	8 ft			X				
	B-108	III	10/20/2003	4 ft			X				
		III	10/20/2003	10 ft			X				
	B-109	III	10/20/2003	4 ft			X				
		III	10/20/2003	8 ft			X				
SWMU 19. Area North of Building 1 SWMU 23. Area East of Building 1 AOC 3. Building 1	B-27	I	11/30/1999	3 ft	X		X				
		I	11/30/1999	0-4 in	X		X				
		I	11/30/1999	15 ft			X				
	B-28	I	12/1/1999	0-4 in	X		X				
	B-29	I	12/1/1999	0-4 in	X		X				
		I	12/1/1999	13 ft			X				
	B-39	I	12/2/1999	0-4 in	X		X				
	B-59	II	11/12/2001	3 ft			X				X
		II	11/12/2001	15 ft			X				
	B-69	II	11/12/2001	3 ft	X		X				X
		II	11/12/2001	15 ft	X		X				
	B-77	II	11/12/2001	5 ft			X				X
		II	11/12/2001	16 ft			X				
	B-83	II	11/12/2001	1 ft			X				X
		II	11/12/2001	15 ft			X				
SWMU 20. Paint Can Burial Pit	B-4	I	12/1/1999	0-4 in	X		X				
		I	12/1/1999	16 ft	X		X				
	B-52	II	11/7/2001	4 ft			X				
SWMU 22. Old Still Area West of Building 1	B-80	II	11/12/2001	1 ft			X				X
		II	11/12/2001	15 ft			X				
AOC 1. Laboratory Sample Storage Area	B-1	I	12/1/1999	0-4 in	X	X	X	X			
		I	12/1/1999	16 ft			X				
	B-97	II	8/20/2002	12 ft			X				X
		II	8/20/2002	14 ft			X				
AOC 4. Concrete Vault	B-25	I	11/30/1999	11 ft	X		X				
		I	11/30/1999	15 ft			X				
	B-26	I	11/30/1999	10 ft	X		X				
	B-44	I	11/30/1999	11 ft	X		X				
		I	11/30/1999	15 ft			X				
AOC 11. Bulk Storage Tanks	B-16	I	12/1/1999	1-3 ft	X	X	X				
	B-17	I	12/1/1999	1-3 ft	X	X	X				
Other Areas											
OA # 1. Lagoon Area	B-35	I	12/2/1999	6 ft	X	X	X				
		I	12/2/1999	13 ft			X				
	B-51	II	11/7/2001	4 ft			X				
		II	11/7/2001	15 ft			X				
OA # 2. Former ASTs	B-36	I	12/2/1999	8 ft			X				
		I	12/2/1999	1-3 ft	X		X		X		
OA # 3. Possible Former AST Area	B-37	I	12/2/1999	3 ft	X		X		X		
OA # 4. Possible Former Drum Storage	B-38	I	12/2/1999	3 ft	X		X		X		
OA # 5. Trench Leading to Ditch	B-24	I	11/30/1999	3 ft	X		X				
		I	11/30/1999	6 ft	X		X				
OA # 6. Northeastern Corner	B-40	I	12/1/1999	0-4 in	X		X				
		I	12/1/1999	16 ft			X				
	B-41	I	12/1/1999	0-4 in	X		X				
	B-42	I	12/1/1999	0-4 in	X		X				
	B-53	II	11/7/2001	5 ft			X				
		II	11/7/2001	17 ft			X				
	B-54	II	11/7/2001	4 ft	X		X				
		II	11/7/2001	17 ft	X		X				
	B-55	II	11/6/2001	3 ft			X				
		II	11/6/2001	17 ft			X				
	B-61	II	11/7/2001	0.5 ft	X		X				
		II	11/7/2001	4 ft	X		X				
		II	11/7/2001	18 ft	X		X				
	B-62	II	11/7/2001	0.5 ft	X		X				
		II	11/7/2001	5 ft	X		X				

TABLE 2
Summary of Historic Sample Locations and Analytical Parameters
Phase IV RFI Report
Clean Harbors Kansas, LLC

SWMU / AOC/ Other Area	Boring ID	RFI Phase	Date Completed	Sample Depth	Soil Analytical Parameters						Groundwater Analytical Parameters
					Metals	SVOC's	VOC's	Pesticides	DRO	BTEX	VOC's
OA # 6. Northeastern Corner		II	11/7/2001	17 ft	X		X				
	B-63	II	11/12/2001	0.5 ft	X		X				X
		II	11/12/2001	11 ft	X		X				
		II	11/12/2001	19 ft	X		X				
	B-70	II	11/7/2001	0.5 ft	X						
		II	11/7/2001	18 ft	X		X				
		II	11/7/2001	8 ft	X		X				
	B-70V	III*	1/31/2005	8 ft			X				
		III*	1/31/2005	16 ft			X				
	B-93	II	11/7/2001	18 ft			X				X
		III	8/21/2002	9.5 ft			X				
	B-94	III	8/21/2002	3 ft			X				X
		III	8/21/2002	10.5 ft			X				
	B-95	III	8/22/2002	2.5 ft			X				X
		III	8/22/2002	10.5 ft			X				
	B-99	III	8/21/2002	8 ft			X				X
		III	8/21/2002	12 ft			X				X
Soil Borings / Samples for Additional Metals Testing	B-64	II	11/8/2001	0.5 ft	X						
		II	11/8/2001	3 ft	X						
		II	11/8/2001	16 ft	X						
	B-65	II	11/8/2001	0.5 ft	X						
		II	11/8/2001	3 ft	X						
		II	11/8/2001	16 ft	X						
	B-66	II	11/8/2001	0.5 ft	X						
		II	11/8/2001	3 ft	X						
		II	11/8/2001	16 ft	X						
	B-67	II	11/8/2001	0.5 ft	X						
		II	11/8/2001	3 ft	X						
		II	11/8/2001	16 ft	X						
Exploratory Borings	EB-1	I	12/2/1999	13 ft							X
		I	12/2/1999	22.5 ft							X
		I	12/2/1999	35 ft							X
	EB-2	I	12/2/1999	16 ft							X
		I	12/2/1999	23 ft							X
		I	12/2/1999	32.5 ft							X
	EB-3	I	12/2/1999	16 ft							X
		I	12/2/1999	23 ft							X
		I	12/2/1999	35 ft							X
	EB-4	I	12/1/1999	15 ft							X
		I	12/1/1999	24.5 ft							X
		I	12/1/1999	36 ft							X
	EB-5	I	12/1/1999	17.5 ft							X
		I	12/1/1999	24 ft							X
		I	12/1/1999	39 ft							X

*Supplimentary data taken for phase III
ft - feet
in - inches

TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

DRAFT

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
Groundwater		(ft below the water										
AOC#11	A11-1	2	10/15/13				X				X	X
AOC#12	A12-1-Clay	27	10/17/13							X		X
	A12-1-Lower	30	10/17/13							X		X
	A12-1	2	10/9/13							X		X
	A12-3	2	10/9/13							X		X
	MW-18	2	10/19/13							X		
AOC#8	A8-1	2	10/1/13									X
AOC#10	A10-3	2	10/3/13				X					X
	A10-4	2	10/1/13				X					X
	A10-5	2	10/3/13									X
North Bldg J	NBJ-1	2	10/7/13									X
	NBJ-1a	2	10/14/13									X
	NBJ-2	2	2/12/14									X
	NBJ-3	2	2/12/14									X
	NBJ-4	2	2/12/14									X
South Bldg J	SEBJ-1	2	10/3/13									X
	SEBJ-2	2	10/4/13									X
	SEBJ-3	2	10/3/13									X
SWMU#1	S1-1	2	10/8/13				X				X	X
	S1-2	2	10/17/13				X				X	X
SWMU#10	S10-1	2	10/7/13	X	X		X				X	X
SWMU#11	S11-1	2	10/4/13	X	X		X					X
	S11-1a	2	10/16/13									X
	S11-2	2	10/3/13	X								X
	S11-3	2	10/3/13	X								X
SWMU#13	S13-1	2	10/10/13				X				X	X
	S13-2	2	10/10/13				X				X	X
	S13-3	2	10/8/13				X					X
	S13-3R	2	10/17/13								X	
SWMU#14	S14-2	2	10/10/13				X				X	X
	S14-4	2	10/7/13				X					X
	S14-4R	2	10/17/13								X	
SWMU#15	JC-1	2	12/20/13									X
	JC-11	2	10/18/13									X
	JC-13	2	10/18/13									X
	JC-3	2	10/18/13									X
	JC-5	2	10/18/13									X
	JC-5a	2	10/18/13									X
	JC-7	2	10/18/13									X
	JC-9	2	10/18/13									X
SWMU#16	BC-2	2	10/17/13									X
SWMU#17	S17-1	2	10/7/13				X					X
	S17-1a	2	10/7/13									X
	S17-2	2	10/4/13									X
	S18-4	2	10/8/13		X		X					X
SWMU#18	S18-1	2	10/7/13				X					X
	S18-2	2	10/7/13									X
	S18-3	2	10/4/13									X
	S18-5	2	10/8/13									X
SWMU#2	S2-1	2	10/18/13	X			X				X	X
SWMU#20	S20-1	2	10/7/13				X					X
SWMU#22	S22-1	2	10/9/13							X		X
SWMU#22	S22-2	2	10/9/13							X		X
SWMU#24	S24-1	2	10/10/13									X
	S24-2	2	10/8/13									X
	S24-2	2	10/10/13							X		
	S24-3	2	10/8/13									X
	S24-4	2	10/10/13									X
SWMU#25	S25-1	2	10/8/13									X
	S25-2	2	10/9/13									X
SWMU#3	S3-1	2	10/18/13	X			X				X	X
SWMU#4	S4-1	2	10/15/13				X				X	X
	S4-2	2	10/15/13				X				X	X
SWMU#5	DC-SUMP	2	10/17/13									X

TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#7	DC-3	2	10/16/13									X
SWMU#8	DC-6	2	10/16/13									X
	DC-9	2	10/9/13									X
SWMU#9	DC-17	2	10/9/13									X
Transects	T1-1	2	10/7/13									X
	T1-2	2	10/11/13									X
	T2-1	2	10/10/13									X
	T3-1	2	10/3/13									X
	T3-2	2	10/7/13									X
	T3-3	2	10/11/13									X
	T4-1	2	10/2/13									X
	T4-2	2	10/3/13									X
	T4-3	2	10/4/13									X
	T5-1	2	10/2/13									X
	T5-3	2	10/1/13									X
	T5-4	2	10/11/13									X
	T6-1	2	10/1/13									X
	T6-2	2	10/17/13		X		X					X
	T7-1	2	10/3/13									X
	T7-2	2	10/1/13									X
	T8-0	2	10/4/13									X
	T8-1	2	10/4/13									X
	T8-1D	2	10/14/13									X
	T8-2	2	10/4/13									X
	T8-2D	2	10/14/13									X
	T8-3	2	10/4/13									X
	T8-4	2	10/4/13									X
	T8-5	2	10/4/13									X
	TO-1	2	10/11/13									X
Vertical Stratification	SK-12S-2-Hydrasleeve	2	10/1/13									X
	SK-12S-4-Hydrasleeve	4	10/1/13									X
	SK-12S-6-Hydrasleeve	6	10/1/13									X
	SK-12S-Ver-2	2	10/2/13									X
	SK-12S-Ver-4	4	10/2/13									X
	SK-12S-Ver-6	6	10/2/13									X
	SK-12S	2	10/4/13									X
	SK-1S-2-Hydrasleeve	2	9/30/13									X
	SK-1S-4-Hydrasleeve	4	9/30/13									X
	SK-1S-6-Hydrasleeve	6	9/30/13									X
	SK-1S-8-Hydrasleeve	8	9/30/13									X
	SK-1S-10-Hydrasleeve	10	9/30/13									X
	SK-1S-Ver-2	2	10/2/13									X
	SK-1S-Ver-4	4	10/2/13									X
	SK-1S-Ver-6	6	10/2/13									X
	SK-1S-Ver-8	8	10/2/13									X
	SK-1S	2	10/4/13									X
	SK-2S-2-Hydrasleeve	2	10/1/13									X
	SK-2S-4-Hydrasleeve	4	10/1/13									X
	SK-2S-6-Hydrasleeve	6	10/1/13									X
	SK-2S-8-Hydrasleeve	8	10/1/13									X
	SK-2S-10-Hydrasleeve	10	10/1/13									X
	SK-2S-Ver-2	2	10/2/13									X
	SK-2S-Ver-4	4	10/2/13									X
	SK-2S-Ver-6	6	10/2/13									X
	SK-2S-Ver-8	8	10/2/13									X
	SK-2S-Ver-10	10	10/2/13									X
	SK-2S	2	10/4/13									X

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TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
Soil		(ft below										
AOC#11	A11-1-0.5	0.5	10/15/13				X				X	X
	A11-1-2	2	10/15/13				X				X	X
	A11-1-5	5	10/15/13									X
	A11-1-10	10	10/15/13									X
	A11-1-15	15	10/15/13									X
	A11-1-INT	17	10/15/13									X
AOC#12	A12-1-0.5	0.5	10/9/13							X		X
	A12-1-2	2	10/9/13							X		X
	A12-1-5	5	10/9/13							X		X
	A12-1-10	10	10/9/13							X		X
	A12-1-15	15	10/9/13							X		X
	A12-1-INT	17	10/9/13							X		X
	A12-10-5	5	12/17/13									X
	A12-10-10	10	12/17/13									X
	A12-10-15	15	12/17/13									X
	A12-10-20	20	12/17/13									X
	A12-2-0.5	0.5	10/9/13							X		X
	A12-2-2	2	10/9/13							X		X
	A12-2-5	5	10/9/13							X		
	A12-3-0.5	0.5	10/18/13							X		X
	A12-3-2	2	10/9/13							X		X
	A12-3-5	5	10/9/13							X		X
	A12-3-10	10	10/9/13							X		X
	A12-3-15	15	10/9/13							X		X
	A12-3-INT	16	10/9/13							X		
	A12-3-19	19	10/9/13									X
	A12-4-0.5	0.5	10/9/13							X		X
	A12-4-2	2	10/9/13							X		X
	A12-4-5	5	10/9/13									X
	A12-5-0.5	0.5	10/9/13							X		X
	A12-5-2	2	10/9/13							X		X
	A12-5-5	5	10/9/13							X		X
	A12-6-0.5	0.5	10/9/13							X		
	A12-6-2	2	10/9/13							X		
	A12-7-5	5	12/17/13									X
	A12-7-10	10	12/17/13									X
	A12-7-15	15	12/17/13									X
	A12-7-20	20	12/17/13									X
	A12-7-20	20	12/19/13									X
	A12-8-5	5	12/17/13									X
	A12-8-10	10	12/17/13									X
	A12-8-15	15	12/17/13									X
	A12-8-20	20	12/17/13									X
	A12-9-5	5	12/17/13									X
	A12-9-10	10	12/17/13									X
	A12-9-15	15	12/17/13									X
	A12-9-20	20	12/17/13									X
	BG-1		10/11/13							X		
	BG-2		10/11/13							X		
	BG-3		10/11/13							X		
	BG-4		10/11/13							X		
AOC#8	A8-1-0.5	0.5	10/1/13									X
	A8-1-2	2	10/1/13									X
	A8-1-5	5	10/1/13									X
	A8-1-10	10	10/1/13									X
	A8-1-15	15	10/1/13									X
	A8-1-INT	17	10/1/13									X
AOC-10	A10-1-0.5	0.5	10/2/13				X					
	A10-1-2	2	10/2/13				X					X
	A10-1-5	5	10/2/13				X					X
	A10-1-10	10	10/2/13				X					X
	A10-1-15	15	10/2/13				X					X
	A10-1-INT	19	10/2/13				X					
	A10-10-2	2	12/18/13									X
	A10-10-5	5	12/18/13									X

TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

DRAFT

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
AOC-10	A10-10-10	10	12/19/13									X
	A10-10-15	15	12/19/13									X
	A10-11-2	2	12/18/13									X
	A10-11-5	5	12/18/13									X
	A10-12-5	5	12/19/13									X
	A10-12-10	10	12/19/13									X
	A10-12-15	15	12/19/13									X
	A10-13-5	5	12/19/13									X
	A10-13-10	10	12/19/13									X
	A10-13-15	15	12/19/13									X
	A10-14-2	2	12/19/13									X
	A10-15-5	5	1/6/14									X
	A10-15-10	10	1/6/14									X
	A10-16-2	2	1/6/14									X
	A10-16-5	5	1/6/14									X
	A10-17-2	2	1/6/14									X
	A10-17-5	5	1/6/14									X
	A10-17-10	10	1/6/14									X
	A10-17-15	15	1/6/14									X
	A10-2-0.5	0.5	10/11/13				X					X
	A10-2-2	2	10/2/13				X					X
	A10-2-5	5	10/2/13				X					
	A10-2-5	5	10/11/13									X
	A10-2-10	10	10/2/13				X					
	A10-2-10	10	10/11/13									X
	A10-2-15	15	10/2/13				X					
	A10-2-15	15	10/11/13									X
	A10-2-17	17	10/2/13									X
	A10-2-INT	18	10/2/13				X					
	A10-2-INT	18	10/11/13									X
	A10-3-2	2	10/3/13				X					X
	A10-3-5	5	10/3/13				X					X
	A10-3-10	10	10/3/13				X					X
	A10-3-15	15	10/3/13				X					
	A10-3-INT	17	10/3/13				X					
	A10-4-0.5	0.5	10/1/13				X					
	A10-4-2	2	10/1/13				X					X
	A10-4-5	5	10/1/13				X					X
	A10-4-10	10	10/1/13				X					X
	A10-4-15	15	10/1/13				X					
	A10-4-INT	17	10/1/13				X					
	A10-4-Clay	27	10/1/13									X
	A10-5-0.5	0.5	10/3/13				X					
	A10-5-2	2	10/3/13				X					X
	A10-5-5	5	10/3/13				X					X
	A10-5-10	10	10/3/13				X					X
	A10-5-15	15	10/3/13				X					
	A10-5-INT	16	10/3/13				X					
	A10-6-2	2	12/18/13				X					X
	A10-6-5	5	12/18/13				X					X
	A10-6-10	10	12/18/13				X					X
	A10-6-15	15	12/18/13				X					X
	A10-6-20	20	12/18/13				X					X
	A10-7-2	2	12/18/13				X					X
	A10-7-5	5	12/18/13				X					X
	A10-7-10	10	12/18/13				X					X
	A10-7-15	15	12/18/13				X					X
	A10-7-20	20	12/18/13				X					X
	A10-8-5	5	12/18/13									X
	A10-9-2	2	12/18/13									X
	A10-9-5	5	12/18/13									X
	A10-9-10	10	12/19/13									X
	A10-9-15	15	12/19/13									X

TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
North Bldg J	NBJ-1-0.5	0.5	10/7/13									X
	NBJ-1-2	2	10/7/13									X
	NBJ-1-5	5	10/7/13									X
	NBJ-1-10	10	10/7/13									X
	NBJ-1-15	15	10/7/13									X
	NBJ-1-INT	15.7	10/7/13									X
	NBJ-2-5	5	2/12/14									X
	NBJ-2-10	10	2/12/14									X
	NBJ-2-15	15	2/12/14									X
	NBJ-2-20	20	2/12/14									X
	NBJ-3-5	5	2/12/14									X
	NBJ-3-10	10	2/12/14									X
	NBJ-3-15	15	2/12/14									X
	NBJ-3-20	20	2/12/14									X
	NBJ-4-5	5	2/12/14									X
	NBJ-4-10	10	2/12/14									X
	NBJ-4-15	15	2/12/14									X
	NBJ-4-20	20	2/12/14									X
	SEBJ-1-0.5	0.5	10/3/13									X
	SEBJ-1-2	2	10/3/13									X
	SEBJ-1-5	5	10/3/13									X
	SEBJ-1-10	10	10/3/13									X
	SEBJ-1-15	15	10/3/13									X
	SEBJ-1-INT	17	10/3/13									X
	SEBJ-10-5	5	1/6/14									X
	SEBJ-10-10	10	1/6/14									X
	SEBJ-10-15	15	1/6/14									X
	SEBJ-10-20	20	1/6/14									X
	SEBJ-11-5	5	1/6/14									X
	SEBJ-11-10	10	1/6/14									X
	SEBJ-11-15	15	1/6/14									X
	SEBJ-11-20	20	1/6/14									X
	SEBJ-12-5	5	1/8/14									X
	SEBJ-12-10	10	1/8/14									X
	SEBJ-12-15	15	1/8/14									X
	SEBJ-12-20	20	1/8/14									X
	SEBJ-13-5	5	1/8/14									X
	SEBJ-13-10	10	1/8/14									X
	SEBJ-13-15	15	1/8/14									X
	SEBJ-13-20	20	1/8/14									X
	SEBJ-14-5	5	1/9/14									X
	SEBJ-14-10	10	1/9/14									X
	SEBJ-14-15	15	1/9/14									X
	SEBJ-14-20	20	1/9/14									X
	SEBJ-2-0.5	0.5	10/3/13									X
	SEBJ-2-2	2	10/3/13									X
	SEBJ-2-5	5	10/18/13									X
	SEBJ-2-10	10	10/4/13									X
	SEBJ-2-15	15	10/4/13									X
	SEBJ-2-INT	18	10/4/13									X
	SEBJ-3-0.5	0.5	10/14/13									X
	SEBJ-3-2	2	10/14/13									X
	SEBJ-3-5	5	10/14/13									X
	SEBJ-3-10	10	10/14/13									X
	SEBJ-3-15	15	10/18/13									X
	SEBJ-3-INT	16	10/18/13									X
	SEBJ-4-10	10	12/19/13									X
	SEBJ-4-15	15	12/19/13									X
	SEBJ-4-20	20	12/19/13									X
	SEBJ-5-10	10	12/19/13									X
	SEBJ-5-15	15	12/19/13									X
	SEBJ-5-20	20	12/19/13									X
	SEBJ-6-10	10	12/19/13									X
	SEBJ-6-15	15	12/19/13									X
	SEBJ-6-20	20	12/19/13									X
	SEBJ-7-10	10	12/18/13									X

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Summary of Phase IV Sample Locations and Analytical Parameters

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Clean Harbors Kansas, LLC

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
North Bldg J	SEBJ-7-15	15	12/18/13									X
	SEBJ-7-20	20	12/18/13									X
	SEBJ-8-5	5	1/6/14									X
	SEBJ-8-10	10	1/6/14									X
	SEBJ-8-15	15	1/6/14									X
	SEBJ-8-20	20	1/6/14									X
	SEBJ-9-5	5	1/6/14									X
	SEBJ-9-10	10	1/6/14									X
	SEBJ-9-15	15	1/6/14									X
	SEBJ-9-20	20	1/6/14									X
SWMU#1	S1-1-0.5	0.5	10/8/13				X				X	X
	S1-1-2	2	10/8/13				X				X	X
	S1-1-5	5	10/8/13									X
	S1-1-10	10	10/8/13									X
	S1-1-15	15	10/8/13									X
	S1-1-INT	16.8	10/8/13									X
	S1-2-0.5	0.5	10/17/13				X				X	X
	S1-2-2	2	10/17/13				X				X	X
	S1-2-5	5	10/17/13									X
	S1-2-10	10	10/17/13									X
	S1-2-15	15	10/17/13									X
	S1-2-INT	16	10/17/13									X
SWMU#10	S10-1-0.5	0.5	10/7/13	X			X				X	X
	S10-1-2	2	10/7/13				X				X	X
	S10-1-5	5	10/7/13									X
	S10-1-10	10	10/7/13									X
	S10-1-15	15	10/7/13									X
	S10-1-INT	16.5	10/7/13	X								X
	S10-2-5	5	10/10/13								X	X
	S10-2-10	10	10/10/13								X	X
	S10-2-15	15	10/10/13								X	X
	S10-2-20	20	10/10/13								X	X
SWMU#11	S11-1-0.5	0.5	10/3/13	X								X
	S11-1-2	2	10/3/13									X
	S11-1-5	5	10/3/13		X		X					X
	S11-1-10	10	10/3/13									X
	S11-1-15	15	10/3/13		X		X					X
	S11-1-INT	18.5	10/3/13	X								X
	S11-10-5	5	12/20/13									X
	S11-10-10	10	12/20/13									X
	S11-10-15	15	12/20/13									X
	S11-10-20	20	12/20/13									X
	S11-11-5	5	12/20/13									X
	S11-11-10	10	12/20/13									X
	S11-11-15	15	12/20/13									X
	S11-11-20	20	12/20/13									X
	S11-12-5	5	12/20/13									X
	S11-12-10	10	12/20/13									X
	S11-12-15	15	12/20/13									X
	S11-12-20	20	12/20/13									X
	S11-13-5	5	1/7/14									X
	S11-13-10	10	1/7/14									X
	S11-13-15	15	1/7/14									X
	S11-13-20	20	1/7/14									X
	S11-14-5	5	1/7/14									X
	S11-14-10	10	1/7/14									X
	S11-14-15	15	1/7/14									X
	S11-14-20	20	1/7/14									X
	S11-15-5	5	1/7/14									X
	S11-15-10	10	1/7/14									X
	S11-15-15	15	1/7/14									X
	S11-15-20	20	1/7/14									X
	S11-16-5	5	1/7/14									X
	S11-16-10	10	1/7/14									X
	S11-16-15	15	1/7/14									X
	S11-16-20	20	1/7/14									X

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#11	S11-17-5	5	1/7/14									X
	S11-17-10	10	1/7/14									X
	S11-17-15	15	1/7/14									X
	S11-17-20	20	1/7/14									X
	S11-18-5	5	1/8/14									X
	S11-18-10	10	1/8/14									X
	S11-18-15	15	1/8/14									X
	S11-18-20	20	1/8/14									X
	S11-19-5	5	1/8/14									X
	S11-19-10	10	1/8/14									X
	S11-19-15	15	1/8/14									X
	S11-19-20	20	1/8/14									X
	S11-1a-20	20	10/16/13		X		X					X
	S11-2-0.5	0.5	10/3/13	X								X
	S11-2-2	2	10/3/13									X
	S11-2-5	5	10/3/13									X
	S11-2-10	10	10/3/13									X
	S11-2-15	15	10/3/13									X
	S11-2-INT	17	10/3/13	X								X
	S11-20-5	5	1/7/14									X
	S11-20-10	10	1/7/14									X
	S11-20-15	15	1/7/14									X
	S11-20-20	20	1/7/14									X
	S11-21-5	5	1/7/14									X
	S11-21-10	10	1/7/14									X
	S11-21-15	15	1/7/14									X
	S11-21-20	20	1/7/14									X
	S11-22-5	5	1/7/14									X
	S11-22-10	10	1/7/14									X
	S11-22-15	15	1/7/14									X
	S11-22-20	20	1/7/14									X
	S11-23-5	5	1/7/14									X
	S11-23-10	10	1/7/14									X
	S11-23-15	15	1/7/14									X
	S11-23-20	20	1/7/14									X
	S11-24-5	5	1/8/14									X
	S11-24-10	10	1/8/14									X
	S11-24-15	15	1/8/14									X
	S11-24-20	20	1/8/14									X
	S11-25-5	5	1/8/14									X
	S11-25-10	10	1/8/14									X
	S11-25-15	15	1/8/14									X
	S11-25-20	20	1/8/14									X
	S11-26-5	5	1/9/14									X
	S11-26-10	10	1/9/14									X
	S11-26-15	15	1/9/14									X
	S11-26-20	20	1/9/14									X
	S11-27-5	5	1/9/14									X
	S11-27-10	10	1/9/14									X
	S11-27-15	15	1/9/14									X
	S11-27-20	20	1/9/14									X
	S11-28-5	5	1/9/14									X
	S11-28-10	10	1/9/14									X
	S11-28-15	15	1/9/14									X
	S11-28-20	20	1/9/14									X
	S11-3-0.5	0.5	10/3/13	X								
	S11-3-0.5	0.5	10/11/13									X
	S11-3-2	2	10/11/13									X
	S11-3-5	5	10/11/13									X
	S11-3-10	10	10/11/13									X
	S11-3-15	15	10/11/13									X
	S11-3-INT	16	10/3/13	X								
	S11-3-INT	16	10/11/13									X
	S11-4-2	2	12/18/13									X
	S11-4-5	5	12/18/13									X
	S11-4-10	10	12/18/13									X

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
	S11-4-15	15	12/18/13									X
	S11-4-20	20	12/18/13									X
	S11-5-2	2	12/18/13									X
	S11-5-5	5	12/18/13									X
	S11-5-10	10	12/18/13									X
	S11-5-15	15	12/18/13									X
	S11-5-20	20	12/18/13									X
	S11-6-2	2	12/18/13									X
	S11-6-5	5	12/18/13									X
	S11-6-10	10	12/18/13									X
	S11-6-15	15	12/18/13									X
SWMU#11	S11-7-5	5	12/20/13									X
	S11-7-10	10	12/20/13									X
	S11-7-15	15	12/20/13									X
	S11-7-20	20	12/20/13									X
	S11-8-5	5	12/20/13									X
	S11-8-10	10	12/20/13									X
	S11-8-15	15	12/20/13									X
	S11-8-20	20	12/20/13									X
	S11-9-5	5	12/20/13									X
	S11-9-10	10	12/20/13									X
	S11-9-15	15	12/20/13									X
	S11-9-20	20	12/20/13									X
	S13-1-0.5	0.5	10/10/13				X				X	X
	S13-1-2	2	10/10/13				X				X	X
	S13-1-5	5	10/10/13									X
	S13-1-10	10	10/10/13									X
	S13-1-INT	12	10/10/13									X
	S13-1-15	15	10/10/13									X
	S13-2-0.5	0.5	10/10/13				X				X	X
	S13-2-2	2	10/10/13				X				X	X
	S13-2-5	5	10/10/13									X
	S13-2-10	10	10/10/13									X
SWMU#13	S13-2-15	15	10/10/13									X
	S13-2-INT	16	10/10/13									X
	S13-3-0.5	0.5	10/8/13				X				X	X
	S13-3-2	2	10/8/13				X				X	X
	S13-3-5	5	10/8/13								X	X
	S13-3-10	10	10/8/13									X
	S13-3-INT	13.5	10/8/13									X
	S13-3-15	15	10/8/13									X
	S13-4-0.5	0.5	10/10/13				X				X	X
	S13-4-2	2	10/10/13				X				X	X
	S13-4-5	5	10/10/13									X
	S14-1-0.5	0.5	10/8/13				X					
	S14-1-2	2	10/8/13				X				X	X
	S14-1-5	5	10/8/13								X	
	S14-10-2	2	12/20/13									X
	S14-10-5	5	12/20/13									X
	S14-10-10	10	12/20/13									X
	S14-10-15	15	12/20/13									X
	S14-10-20	20	12/20/13									X
	S14-11-2	2	12/20/13									X
	S14-11-5	5	12/20/13									X
SWMU#14	S14-11-10	10	12/20/13									X
	S14-11-15	15	12/20/13									X
	S14-11-20	20	12/20/13									X
	S14-12-2	2	12/20/13									X
	S14-12-5	5	12/20/13									X
	S14-12-10	10	12/20/13									X
	S14-12-15	15	12/20/13									X
	S14-12-20	20	12/20/13									X
	S14-13-5	5	1/8/14									X
	S14-13-10	10	1/8/14									X
	S14-13-15	15	1/8/14									X
	S14-13-20	20	1/8/14									X

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#14	S14-13-10a	10a	2/12/14									X
	S14-13-15a	15a	2/12/14									X
	S14-13-20a	20a	2/12/14									X
	S14-13-5a	5a	2/12/14									X
	S14-14-5	5	2/12/14									X
	S14-14-10	10	2/12/14									X
	S14-14-15	15	2/12/14									X
	S14-14-20	20	2/12/14									X
	S14-15-5	5	2/12/14									X
	S14-15-10	10	2/12/14									X
	S14-15-15	15	2/12/14									X
	S14-15-20	20	2/12/14									X
	S14-16-5	5	2/12/14									X
	S14-16-10	10	2/12/14									X
	S14-16-15	15	2/12/14									X
	S14-16-20	20	2/12/14									X
	S14-17-5	5	2/12/14									X
	S14-17-10	10	2/12/14									X
	S14-17-15	15	2/12/14									X
	S14-17-20	20	2/12/14									X
	S14-2-0.5	0.5	10/10/13				X					X
	S14-2-2	2	10/10/13				X				X	X
	S14-2-5	5	10/10/13									X
	S14-2-10	10	10/10/13									X
	S14-2-INT	13	10/10/13									X
	S14-2-15	15	10/10/13									X
	S14-3-0.5	0.5	10/8/13				X				X	X
	S14-3-2	2	10/8/13				X				X	X
	S14-3-5	5	10/8/13									X
	S14-4-0.5	0.5	10/7/13				X				X	X
	S14-4-2	2	10/7/13				X				X	X
	S14-4-5	5	10/7/13									X
	S14-4-10	10	10/7/13									X
	S14-4-INT	14.8	10/7/13									X
	S14-4-15	15	10/7/13									X
	S14-5-0.5	0.5	10/7/13				X				X	X
	S14-5-2	2	10/7/13				X				X	X
	S14-5-5	5	10/7/13									X
	S14-6-0.5	0.5	12/19/13									X
	S14-6-5	5	12/19/13									X
	S14-6-10	10	12/19/13									X
	S14-6-15	15	12/19/13									X
	S14-6-20	20	12/19/13									X
	S14-7-0.5	0.5	12/19/13									X
	S14-7-5	5	12/19/13									X
	S14-7-10	10	12/19/13									X
	S14-7-15	15	12/19/13									X
	S14-7-20	20	12/19/13									X
	S14-8-0.5	0.5	12/19/13									X
	S14-8-5	5	12/19/13									X
	S14-8-10	10	12/19/13									X
	S14-8-15	15	12/19/13									X
	S14-8-20	20	12/19/13									X
	S14-9-2	2	12/20/13									X
	S14-9-5	5	12/20/13									X
	S14-9-10	10	12/20/13									X
	S14-9-15	15	12/20/13									X
	S14-9-20	20	12/20/13									X
SWMU#15	JC-1-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-1-2	2	10/18/13	X		X	X	X	X		X	X
	JC-1-5	5	10/18/13									X
	JC-1-10	10	10/18/13									X
	JC-1-15	15	10/18/13									X
	JC-1-INT	18	10/18/13									X
	JC-10-0.5	0.5	10/18/13	X	X	X	X	X	X		X	X
	JC-10-2	2	10/18/13	X	X	X	X	X	X		X	

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
	JC-11-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-11-2	2	10/18/13	X		X	X	X	X		X	X
	JC-11-5	5	10/18/13									X
	JC-11-10	10	10/18/13									X
	JC-11-15	15	10/18/13		X							
	JC-11-INT	22	10/18/13									X
	JC-12-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-12-2	2	10/18/13	X		X	X	X	X		X	X
	JC-13-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-13-2	2	10/18/13	X		X	X	X	X		X	X
	JC-13-5	5	10/18/13									X
	JC-13-10	10	10/18/13									X
	JC-13-15	15	10/18/13									X
	JC-13-INT	20.9	10/18/13									X
	JC-14-0.5	0.5	10/18/13	X			X		X		X	X
	JC-14-2	2	10/18/13	X		X	X	X	X		X	X
	JC-2-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-2-2	2	10/18/13	X	X	X	X	X	X		X	
	JC-3-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-3-2	2	10/18/13	X		X	X	X	X		X	X
	JC-3-5	5	10/18/13				X					X
	JC-3-10	10	10/18/13									X
	JC-3-15	15	10/18/13									X
	JC-3-INT	22	10/18/13									X
SWMU#15	JC-4-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-4-2	2	10/18/13	X		X	X	X	X		X	X
	JC-4-5	5	10/18/13									X
	JC-5-0.5	0.5	10/18/13	X	X	X	X	X	X		X	X
	JC-5-2	2	10/18/13	X		X	X	X	X		X	X
	JC-5-5	5	10/18/13	X		X	X		X		X	X
	JC-5-10	10	10/18/13									X
	JC-5-15	15	10/18/13									X
	JC-5-INT	15.5	10/18/13									X
	JC-6-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-6-2	2	10/18/13	X		X	X	X	X		X	X
	JC-7-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-7-2	2	10/18/13	X		X	X	X	X		X	X
	JC-7-5	5	10/18/13									X
	JC-7-10	10	10/18/13									X
	JC-7-15	15	10/18/13									X
	JC-7-INT	18	10/18/13									X
	JC-8-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-8-2	2	10/18/13	X		X	X	X	X		X	X
	JC-9-0.5	0.5	10/18/13	X		X	X	X	X		X	X
	JC-9-2	2	10/18/13	X		X	X	X	X		X	X
	JC-9-5	5	10/18/13									X
	JC-9-10	10	10/18/13									X
	JC-9-15	15	10/18/13									X
	JC-9-INT	22	10/18/13									X
	BC-1-0.5	0.5	10/17/13	X		X	X	X	X		X	X
	BC-1-2	2	10/17/13	X		X	X	X	X		X	X
	BC-2-0.5	0.5	10/17/13	X		X	X	X	X		X	X
	BC-2-2	2	10/17/13	X		X	X	X	X		X	X
	BC-3-0.5	0.5	10/17/13	X		X	X	X	X		X	X
SWMU#16	BC-3-2	2	10/17/13	X		X	X	X	X		X	X
	BC-4-0.5	0.5	10/17/13	X		X	X	X	X		X	X
	BC-4-2	2	10/17/13	X		X	X	X	X		X	X
	BC-5-5	5	12/18/13				X					X
	BC-5-10	10	12/18/13				X					X
	BC-5-15	15	12/18/13				X					X
	BC-5-20	20	12/18/13				X					X

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Summary of Phase IV Sample Locations and Analytical Parameters

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Clean Harbors Kansas, LLC

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#17	S17-1-2	2	10/7/13				X					X
	S17-1-5	5	10/7/13				X					X
	S17-1-10	10	10/7/13				X					X
	S17-1-INT	13	10/7/13				X					X
	S17-1-15	15	10/7/13				X					X
	S17-1-Clay	35	10/7/13									X
	S17-2-0.5	0.5	10/4/13									X
	S17-2-2	2	10/4/13									X
	S17-2-5	5	10/4/13									X
	S17-2-10	10	10/4/13									X
	S17-2-15	15	10/4/13									X
	S17-2-INT	17	10/4/13									X
	S18-4-2	2	10/16/13									X
	S18-4-5	5	10/8/13		X		X					
	S18-4-5	5	10/16/13									X
	S18-4-10	10	10/16/13									X
	S18-4-15	15	10/8/13		X		X					
	S18-4-15	15	10/16/13									X
	S18-4-INT	21	10/16/13									X
	S18-4-25	25	10/8/13		X		X					
	S18-4-25	25	10/16/13		X		X					
	S18-1-2	2	10/7/13				X					X
	S18-1-5	5	10/7/13				X					X
	S18-1-10	10	10/7/13				X					X
	S18-1-INT	13	10/7/13				X					X
	S18-1-15	15	10/7/13				X					X
	S18-10-2	2	12/17/13									X
	S18-10-5	5	12/17/13									X
	S18-11-5	5	12/19/13									X
	S18-11-15	15	12/19/13									X
	S18-11-20	20	12/19/13									X
	S18-12-5	5	12/19/13									X
	S18-12-15	15	12/17/13									X
	S18-12-15	15	12/19/13									X
	S18-12-20	20	12/19/13									X
	S18-13-5	5	12/17/13									X
	S18-14-2	2	12/19/13									X
	S18-14-5	5	12/19/13									X
SWMU#18	S18-15-2	2	12/18/13									X
	S18-16-2	2	12/18/13									X
	S18-17-2	2	12/18/13									X
	S18-18-5	5	12/18/13									X
	S18-18-15	15	12/18/13									X
	S18-19-5	5	12/20/13									X
	S18-19-10	10	12/20/13									X
	S18-19-15	15	12/20/13									X
	S18-19-20	20	12/20/13									X
	S18-2-2	2	10/7/13									X
	S18-2-5	5	10/7/13									X
	S18-2-10	10	10/7/13									X
	S18-2-15	15	10/7/13									X
	S18-2-INT	18.5	10/7/13									X
	S18-20-5	5	1/7/14									X
	S18-20-10	10	1/7/14									X
	S18-20-15	15	1/7/14									X
	S18-20-20	20	1/7/14									X
	S18-21-5	5	1/9/14									X
	S18-21-10	10	1/9/14									X
	S18-21-15	15	1/9/14									X
	S18-21-20	20	1/9/14									X
	S18-22-5	5	1/9/14									X
	S18-22-10	10	1/9/14									X
	S18-22-15	15	1/9/14									X
	S18-22-20	20	1/9/14									X
	S18-23-5	5	1/9/14									X
	S18-23-10	10	1/9/14									X

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Summary of Phase IV Sample Locations and Analytical Parameters

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
	S18-23-15	15	1/9/14									X
	S18-23-20	20	1/9/14									X
	S18-24-2	2	1/9/14									X
	S18-24-5	5	1/9/14									X
	S18-25-2	2	1/9/14									X
	S18-25-5	5	1/9/14									X
	S18-26-5	5	1/9/14									X
	S18-26-10	10	1/9/14									X
	S18-26-15	15	1/9/14									X
	S18-26-20	20	1/9/14									X
	S18-3-2	2	10/4/13									X
	S18-3-5	5	10/4/13									X
	S18-3-10	10	10/4/13									X
	S18-3-15	15	10/4/13									X
	S18-3-INT	16	10/4/13									X
	S18-5-0.5	0.5	10/14/13									X
SWMU#18	S18-5-0.5	0.5	10/16/13									X
	S18-5-2	2	10/14/13									X
	S18-5-5	5	10/14/13									X
	S18-5-10	10	10/14/13									X
	S18-5-15	15	10/14/13									X
	S18-5D-INT	15	10/8/13									X
	S18-5D-Clay	26.5	10/16/13									X
	S18-6-2	2	10/7/13									X
	S18-6-5	5	10/7/13									X
	S18-6-10	10	10/7/13									X
	S18-6-15-INT	15	10/7/13									X
	S18-7-2	2	12/17/13									X
	S18-7-5	5	12/17/13									X
	S18-8-2	2	12/17/13									X
	S18-8-5	5	12/17/13									X
	S18-9-2	2	12/17/13									X
	S18-9-5	5	12/17/13									X
	S2-1-0.5	0.5	10/18/13	X			X				X	X
	S2-1-2	2	10/18/13				X				X	X
	S2-1-5	5	10/18/13									X
	S2-1-10	10	10/18/13									X
SWMU#2	S2-1-15	15	10/18/13									X
	S2-1-INT	16	10/18/13	X								X
	S2-2-0.5	0.5	10/18/13	X			X				X	X
	S2-2-2	2	10/18/13				X				X	X
	S2-2-5	5	10/18/13				X				X	X
	S20-1-2	2	10/7/13				X					X
	S20-1-5	5	10/7/13				X					X
	S20-1-10	10	10/7/13				X					X
	S20-1-INT	13	10/7/13				X					X
	S20-1-15	15	10/7/13				X					X
SWMU#20	S20-2-10	10	12/17/13									X
	S20-2-15	15	12/17/13									X
	S20-2-20	20	12/17/13									X
	S20-3-10	10	12/17/13									X
	S20-3-15	15	12/17/13									X
	S20-3-20	20	12/17/13									X
	DC-19-0.5	0.5	10/9/13	X		X	X		X		X	X
SWMU#21	DC-19-2	2	10/9/13	X		X	X		X		X	X
	DC-19-5	5	10/9/13									X
	S22-1-0.5	0.5	10/9/13							X		
	S22-1-0.5	0.5	10/18/13							X		X
	S22-1-2	2	10/9/13									X
	S22-1-5	5	10/9/13									X
SWMU#22	S22-1-10	10	10/9/13									X
	S22-1-15	15	10/9/13									X
	S22-1-INT	16	10/9/13									X
	S22-2-0.5	0.5	10/9/13							X		X
	S22-2-2	2	10/9/13									X
	S22-2-5	5	10/9/13							X		X

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#22	S22-2-10	10	10/9/13									X
	S22-2-15	15	10/9/13									X
	S22-2-INT	17	10/9/13									X
SWMU#24	S24-1-2	2	10/10/13									X
	S24-1-5	5	10/10/13									X
	S24-1-10	10	10/10/13									X
	S24-1-15	15	10/10/13							X		X
	S24-1-INT	17	10/10/13									X
	S24-1D-Clay	38	10/15/13							X		
	S24-1D-lower	44	10/15/13							X		
	S24-2-0.5	0.5	10/14/13				X				X	X
	S24-2-2	2	10/14/13									X
	S24-2-5	5	10/14/13									X
	S24-2-10	10	10/14/13									X
	S24-2-15	15	10/14/13									X
	S24-2-INT	16	10/14/13									X
	S24-3-2	2	10/8/13									X
	S24-3-5	5	10/8/13									X
	S24-3-10	10	10/8/13									X
	S24-3-15-INT	15	10/8/13									X
	S24-4-2	2	10/10/13									X
	S24-4-5	5	10/10/13									X
	S24-4-10	10	10/10/13									X
	S24-4-15	15	10/10/13									X
	S24-4-INT	17	10/10/13									X
SWMU#25	S25-1-0.5	0.5	10/8/13				X				X	X
	S25-1-2	2	10/8/13				X				X	X
	S25-1-5	5	10/8/13									X
	S25-2-0.5	0.5	10/9/13				X				X	
	S25-2-0.5	0.5	10/14/13									X
	S25-2-2	2	10/9/13				X				X	
	S25-2-2	2	10/14/13				X				X	X
	S25-2-5	5	10/14/13									X
	S25-2-15	15	10/14/13									X
	S25-3-5	5	12/18/13									X
	S25-3-10	10	12/18/13									X
	S25-3-15	15	12/18/13									X
	S25-3-20	20	12/18/13									X
SWMU#3	S3-1-0.5	0.5	10/18/13	X			X				X	X
	S3-1-2	2	10/18/13				X				X	X
	S3-1-5	5	10/18/13									X
	S3-1-10	10	10/18/13									X
	S3-1-15	15	10/18/13									X
	S3-1-INT	15.6	10/18/13	X							X	X
	S3-2-0.5	0.5	10/18/13	X			X				X	X
	S3-2-2	2	10/18/13				X				X	X
	S3-2-5	5	10/18/13				X				X	X
SWMU#4	S4-1-0.5	0.5	10/15/13				X				X	X
	S4-1-2	2	10/15/13				X				X	X
	S4-1-5	5	10/15/13									X
	S4-1-10	10	10/15/13									X
	S4-1-15	15	10/15/13									X
	S4-1-INT	16.5	10/15/13									X
	S4-2-0.5	0.5	10/15/13				X				X	X
	S4-2-2	2	10/15/13				X				X	X
	S4-2-5	5	10/15/13									X
	S4-2-10	10	10/15/13									X
	S4-2-15	15	10/15/13									X
	S4-2-INT	18	10/15/13									X

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#5	DC-21-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-21-2	2	10/16/13	X		X	X	X	X		X	X
	DC-21-5	5	10/16/13									X
	DC-22-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-22-2	2	10/16/13	X		X	X	X	X		X	X
	DC-23-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-23-2	2	10/16/13	X		X	X	X	X		X	X
	DC-23-5	5	10/16/13								X	
	DC-24-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-24-2	2	10/16/13	X		X	X	X	X		X	X
	DC-24-5	5	10/16/13									X
	DC-25-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-25-2	2	10/16/13	X		X	X	X	X		X	X
	DC-25-5	5	10/16/13									X
	DC-27-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-27-2	2	10/16/13	X		X	X		X		X	X
	DC-27-5	5	10/16/13	X		X	X		X		X	X
	DC-28-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-28-2	2	10/16/13	X		X	X	X	X		X	X
	DC-28-5	5	10/16/13								X	X
	DC-SUMP-0.5	0.5	10/17/13	X		X	X	X	X		X	X
	DC-SUMP-2	2	10/17/13	X		X	X	X	X		X	X
	DC-SUMP-5	5	10/17/13									X
	DC-Sump-7	7	10/17/13									X
	DC-SUMP-10	10	10/17/13									X
	DC-SUMP-15	15	10/17/13									X
	DC-SUMP-INT	17	10/17/13									X
SWMU#6	DC-26-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-26-2	2	10/16/13	X		X	X	X	X		X	X
	DC-26-5	5	10/16/13									X
SWMU#7	DC-1-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-1-2	2	10/16/13	X		X	X	X	X		X	X
	DC-2-0.5	0.5	10/10/13	X		X	X		X		X	X
	DC-2-2	2	10/10/13			X	X		X		X	X
	DC-2-5	5	10/10/13									X
	DC-3-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-3-2	2	10/16/13	X		X	X	X	X		X	X
	DC-31-10	10	12/19/13									X
	DC-31-15	15	12/19/13									X
	DC-31-20	20	12/19/13									X
	DC-32-10	10	12/19/13									X
	DC-32-15	15	12/19/13									X
	DC-32-20	20	12/19/13									X
	DC-33-5	5	1/8/14									X
	DC-33-10	10	1/8/14									X
	DC-33-15	15	1/8/14									X
	DC-33-20	20	1/8/14									X
SWMU#8	DC-10-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-10-2	2	10/9/13	X		X	X		X		X	X
	DC-11-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-11-2	2	10/9/13	X		X	X		X		X	X
	DC-29-10	10	12/19/13									X
	DC-29-15	15	12/19/13									X
	DC-29-20	20	12/19/13									X
	DC-30-10	10	12/19/13									X
	DC-30-15	15	12/19/13									X
	DC-30-20	20	12/19/13									X
	DC-4-0.5	0.5	10/10/13			X	X		X		X	X
	DC-4-2	2	10/10/13			X	X		X		X	X
	DC-4-5	5	10/10/13									X
	DC-5-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-5-2	2	10/16/13	X		X	X	X	X		X	X
	DC-5-5	5	10/16/13									X
	DC-6-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-6-2	2	10/16/13	X		X	X	X	X		X	X
	DC-6-5	5	10/16/13								X	

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Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
SWMU#8	DC-7-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-7-2	2	10/16/13	X		X	X	X	X		X	X
	DC-7-5	5	10/16/13									X
	DC-8-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-8-2	2	10/9/13	X		X	X		X		X	X
	DC-8-5	5	10/9/13									X
	DC-9-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-9-2	2	10/9/13	X		X	X		X		X	X
	DC-9-5	5	10/9/13									X
SWMU#9	DC-12-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-12-2	2	10/9/13	X		X	X		X		X	X
	DC-13-0.5	0.5	10/16/13	X		X	X		X		X	X
	DC-13-2	2	10/16/13	X		X	X	X	X		X	X
	DC-13-5	5	10/16/13									X
	DC-14-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-14-2	2	10/9/13	X		X	X		X		X	X
	DC-15-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-15-2	2	10/9/13	X		X	X		X		X	X
	DC-16-0.5	0.5	10/16/13	X		X	X	X	X		X	X
	DC-16-2	2	10/16/13	X		X	X	X	X		X	X
	DC-16-5	5	10/16/13									X
	DC-17-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-17-2	2	10/9/13	X		X	X		X		X	
	DC-17-2	2	10/17/13									X
	DC-17-5	5	10/9/13									X
	DC-17-5	5	10/17/13									X
	DC-17-10	10	10/17/13									X
	DC-17-15	15	10/17/13									X
	DC-17-INT	15.5	10/17/13									X
	DC-18-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-18-2	2	10/9/13	X		X	X		X		X	X
	DC-18-5	5	10/9/13									X
	DC-20-0.5	0.5	10/9/13	X		X	X		X		X	X
	DC-20-2	2	10/9/13	X		X	X		X		X	X
Transects	T2-1-Clay	27.5	10/10/13									X
	T3-3-Clay	27.5	10/11/13									X
	T4-3-Clay	25	10/16/13									X
	T5-2-INT	16	10/15/13									X
	T5-2d-23	23	10/15/13									X
	T5-2d-Lower	31	10/15/13									X
	T5-4-20	20	10/11/13									X
	T5-4-Clay	27	10/11/13									X
	T6-2-2	2	10/17/13									X
	T6-2-5	5	10/17/13		X		X					X
	T6-2-10	10	10/17/13									X
	T6-2-15	15	10/17/13		X		X					X
	T6-2-INT	17	10/17/13									X
	T6-2-20	20	10/17/13		X		X					
	T6-2-Clay	26	10/17/13									X
	T7-2-6	6	10/1/13									X
	T8-1D-22	22	10/14/13									X
	T8-2D-22	22	10/14/13									X
Chisholm												
Surface Water	SW-BS-1	--	10/18/13									X
	SW-BS-2	--	10/18/13									X
	SW-BS-3	--	10/18/13									X
	SW-BS-4	--	10/18/13									X
	SW-BS-5	--	10/18/13									X

TABLE 3

Summary of Phase IV Sample Locations and Analytical Parameters

Phase IV RFI Report

Clean Harbors Kansas, LLC

Investigation Area	Sample Location	Depth	Sample Date	DRO	General Chemistry	Herbicides	Metals	PCBS	Pesticides	Rad Chem	SVOCs	VOCs
Pore Water (Collected below Creek Bottom)	PW-1	6 inches	10/4/13						X			X
	PW-10	6 inches	10/11/13						X			X
	PW-11	6 inches	10/11/13						X			X
	PW-2	6 inches	10/4/13						X			X
	PW-3	6 inches	10/4/13						X			X
	PW-4	6 inches	10/4/13						X			X
	PW-5	6 inches	10/8/13						X			X
	PW-6	6 inches	10/9/13						X			X
	PW-7	6 inches	10/11/13						X			X
	PW-8	6 inches	10/11/13						X			X
	PW-9	6 inches	10/11/13						X			X
Creek Sediment	CC-1	--	10/4/13		X		X		X		X	
	CC-10	--	10/11/13		X		X		X		X	
	CC-11	--	10/11/13		X		X		X		X	
	CC-2	--	10/4/13		X		X		X		X	
	CC-3	--	10/4/13		X		X		X		X	
	CC-4	--	10/4/13		X		X		X		X	
	CC-5	--	10/8/13		X		X		X		X	
	CC-6	--	10/9/13		X		X		X		X	
	CC-7	--	10/11/13		X		X		X		X	
	CC-8	--	10/11/13		X		X		X		X	
	CC-9	--	10/11/13		X		X		X		X	
Air												
Air Quality	AS-1	--	10/3/13									X
	AS-2	--	10/3/13									X
	AS-3	--	10/3/13									X
	AS-4	--	10/10/13									X
	AS-5	--	10/10/13									X

SWMU - Solid Waste Management Area
AOC - Area of Concern
ft - feet
DRO - Diesel Range Organics
PCB - Polychlorinated Biphenyl
SVOC - Semi-Volatile Organic Compound
VOC - Volatile Organic Compound

TABLE 4
Soil Interim Action Objectives
Clean Harbors Wichita

Compound	Cas No	IAO (mg/kg)	IAO ref
Volatile Organic Compounds			
1,1,1-Trichloroethane	71-55-6	2.8	a
1,1,2,2-Tetrachloroethane	79-34-5	0.016	a
1,1,2-Trichloroethane	79-00-5	0.081	a
1,1-Dichloroethane	75-34-3	0.269	a
1,1-Dichloroethene	75-35-4	0.0859	a
1,2,4-Trimethylbenzene	95-63-6	1.07	a
1,2-Dichlorobenzene	95-50-1	48.4	a
1,2-Dichloroethane	107-06-2	0.06	a
1,2-Dichloropropane	78-87-5	0.0817	a
1,3,5-Trimethylbenzene	108-67-8	5.51	a
1,4-Dichlorobenzene	106-46-7	5.94	a
1,4-Dioxane	123-91-1	0.384	a
2-Butanone	78-93-3	24.2	a
2-Hexanone	591-78-6	140	d
4-Isopropyltoluene	99-87-6	NA	
4-Methyl-2-Pentanone	108-10-1	6.69	a
Acetone	67-64-1	51.6	a
Benzene	71-43-2	0.168	a
Carbon Disulfide	75-15-0	6.71	a
Carbon Tetrachloride	56-23-5	0.0734	a
Chlorobenzene	108-90-7	5.1	a
Chloroethane	75-00-3	128	a
Chloroform	67-66-3	0.85	a
Cis-1,2-Dichloroethene	156-59-2	0.855	a
Ethylbenzene	100-41-4	65.6	a
Hexachlorobutadiene	87-68-3	1.1	a
Isopropylbenzene	98-82-8	65.1	a
M,P-Xylenes	NULL	809	a
Methyl Tert-Butyl Ether	1634-04-4	0.848	a
Methylene Chloride	75-09-2	0.0429	a
Naphthalene	91-20-3	0.349	a
N-Butylbenzene	104-51-8	50.9	a
N-Propylbenzene	103-65-1	110	a
O-Xylene	95-47-6	809	a
Sec-Butylbenzene	135-98-8	82.7	a
Styrene	100-42-5	9.34	a
Tert-Butylbenzene	98-06-6	10000	d
Tetrachloroethene	127-18-4	0.121	a
Toluene	108-88-3	51.2	a
Trans-1,2-Dichloroethene	156-60-5	1.22	a
Trichloroethene	79-01-6	0.0842	a
Vinyl Chloride	75-01-4	0.0205	a
Semi-Volatile Organic Compounds			
1-Methylnaphthalene	90-12-0	2.19	a
2,4-Dimethylphenol	105-67-9	29.9	a
2-Methylnaphthalene	91-57-6	8.34	a
2-Methylphenol	95-48-7	48.6	a
Acenaphthene	83-32-9	255	a
Acenaphthylene	208-96-8	NA	
Aniline	62-53-3	1.95	a
Anthracene	120-12-7	3770	a
Benzo(A)Anthracene	56-55-3	7.89	a
Benzo(A)Anthracene	56-55-3	7.89	a
Benzo(A)Pyrene	50-32-8	23.5	a
Benzo(B)Fluoranthene	205-99-2	19.2	a

TABLE 4
Soil Interim Action Objectives
Clean Harbors Wichita

Compound	Cas No	IAO (mg/kg)	IAO ref
Benzo(G,H,I)Perylene	191-24-2	NA	
Benzo(K)Fluoranthene	207-08-9	190	a
Bis(2-Ethylhexyl) Phthalate	117-81-7	144	a
Butyl Benzyl Phthalate	85-68-7	478	a
Carbazole	86-74-8	52.7	a
Chrysene	218-01-9	805	a
Dibenz(A,H)Anthracene	53-70-3	3.08	a
Dibenzofuran	132-64-9	7.59	a
Dimethyl Phthalate	131-11-3	NA	
Di-N-Butyl Phthalate	84-74-2	318	a
Fluoranthene	206-44-0	2830	a
Fluorene	86-73-7	297	a
Hexachlorobenzene	118-74-1	1.24	a
Hexachlorobutadiene	87-68-3	1.1	a
Indeno(1,2,3-Cd)Pyrene	193-39-5	45.5	a
Isophorone	78-59-1	1800	d
M-,P-Cresol Mixture		NA	
Naphthalene	91-20-3	0.349	a
N-Nitrosodiphenylamine	86-30-6	350	d
Phenanthrene	85-01-8	NA	
Phenol	108-95-2	189	a
Pyrene	129-00-0	2190	a
Pesticides-Herbicides-PCBs			
2,4,5-T	93-76-5	3.75	a
4,4'-DDD	72-54-8	31.8	a
4,4'-DDE	72-55-9	24.1	a
4,4'-DDT	50-29-3	24.6	a
Alpha-Chlordane	5103-71-9	NA	
Dalapon	75-99-0	0.929	a
Dieldrin	60-57-1	0.193	a
Endosulfan Sulfate	1031-07-8	NA	
Endrin Aldehyde	7421-93-4	NA	
Endrin Ketone	53494-70-5	NA	
Gamma-Chlordane	5103-74-2	NA	
Heptachlor Epoxide	1024-57-3	0.405	a
Mcpp	7085-19-0	NA	
Methoxychlor	72-43-5	215	a
Pcb-1254	11097-69-1	50	e
Pentachlorophenol	87-86-5	0.996	a
Toxaphene	8001-35-2	46.3	a
Metals			
Aluminum	7429-90-5	99000	d
Antimony	7440-36-0	817	b
Arsenic	7440-38-2	63.2	b
Barium	7440-39-3	277000	b
Beryllium	7440-41-7	3650	b
Boron	7440-42-8	20000	d
Cadmium	7440-43-9	965	b
Calcium	7440-70-2	NA	
Chromium	7440-47-3	111	b
Cobalt	7440-48-4	579	b
Copper	7440-50-8	81700	b
Iron	7439-89-6	72000	d
Lead	7439-92-1	1000	b
Lithium	7439-93-2	200	d
Magnesium	7439-95-4	NA	

TABLE 4
Soil Interim Action Objectives
Clean Harbors Wichita

Compound	Cas No	IAO (mg/kg)	IAO ref
Manganese	7439-96-5	66200	b
Mercury	7439-97-6	20	b
Molybdenum	7439-98-7	510	d
Nickel	7440-02-0	32400	b
Potassium	7440-09-7	NA	
Selenium	7782-49-2	10200	b
Silver	7440-22-4	10200	b
Sodium	7440-23-5	NA	
Strontium	7440-24-6	61000	d
Thallium	7440-28-0	0.14	c
Tin	7440-31-5	61000	d
Titanium	7440-31-5	NA	
Vanadium	7440-62-2	510	d
Zinc	7440-66-6	613000	b

IAO - Interim Action Objective

mg/kg - milligrams per kilogram

a - KDHE Tier II Soil to Groundwater (residential)

b - KDHE Tier II Direct Contact (Non residential)

c - USEPA RSL - MCL based SSL for protection of groundwater

d- USEPA RSL - Industrial soil SSL

e. - Kanasas Bureau of Environmetnal Remediation Policy # BER-ARS-047

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
			IAO:		2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
WESTERN REGION															
SWMU#13	S13-1-5	10/10/13		5	--	--	--	--	--	--	--	--	--	--	--
	S13-2-0.5	10/10/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S13-2-2	10/10/13		3	--	--	--	--	--	--	--	--	--	--	--
	S13-2-5	10/10/13		5	--	--	--	--	--	--	--	--	--	--	--
	S13-2-INT	10/10/13		16	--	--	--	--	--	--	--	--	--	--	--
	S13-4-2	10/10/13		2	--	--	--	--	--	--	--	--	--	--	--
SWMU#14	S14-3-0.5	10/8/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S14-4-0.5	10/7/13		0.5	--	--	--	--	--	--	--	3760	--	--	--
	S14-4-15	10/7/13		15	--	--	--	--	--	--	--	--	--	--	--
	S14-4-2	10/7/13		2	--	--	--	--	--	--	--	--	--	--	--
	S14-4-5	10/7/13		5	--	--	--	--	--	--	--	--	--	--	--
	S14-4-INT	10/7/13		14.8	--	--	--	--	--	--	--	--	--	--	--
	S14-5-0.5	10/7/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S14-7-0.5	12/19/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S14-8-0.5	12/19/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S14-8-10	12/19/13		10	--	--	--	--	--	--	--	--	--	--	--
	S14-8-5	12/19/13		5	--	--	--	--	--	--	--	--	--	--	--
	S14-9-15	12/20/13		15	--	--	--	--	--	--	--	--	--	--	--
	S14-9-2	12/20/13		2	--	--	--	--	--	--	--	--	--	--	--
SWMU#24	S24-3-15-INT	10/8/13		15	--	--	--	--	--	--	--	--	--	--	--
	S24-3-2	10/8/13		2	--	--	--	--	--	--	--	--	--	--	--
	S24-3-5	10/8/13		5	--	--	--	--	--	--	--	--	--	--	--
	S24-3-10	10/8/13		10	--	--	--	--	--	--	--	--	--	--	--
Former Dry Solids Gondola															
SWMU#17	S17-1-10	10/7/13		10	--	--	--	--	--	--	--	--	--	--	--
	S17-1-10	10/7/13		10	--	--	--	--	--	--	--	--	--	--	--
	S17-1-15	10/7/13		15	--	--	--	--	--	--	--	--	--	--	--
	S17-1-2	10/7/13		2	--	--	--	--	--	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#17	S17-1-5	10/7/13		5	--	--	--	--	--	--	--	--	--	--	--
	S17-1-INT	10/7/13		13	--	--	--	--	--	--	--	--	--	--	--
	S18-1-15	10/7/13		15	--	--	--	--	--	--	--	--	--	--	--
	S18-1-15	10/7/13		15	--	--	--	--	--	--	--	--	--	--	--
Trailer Parking and Southwestern Corner															
SWMU#18	S18-10-2	12/17/13		2	--	--	--	--	--	--	--	--	--	--	--
	S18-11-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	S18-11-5	12/19/13		5	--	--	--	--	--	--	--	--	--	--	--
	S18-14-2	12/19/13		2	--	--	--	--	--	--	--	--	--	--	--
	S18-16-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	S18-17-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	S18-18-15	12/18/13		15	--	--	--	--	--	--	--	--	--	--	--
	S18-18-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--
	S18-19-10	12/20/13		10	--	--	--	--	--	--	--	--	--	--	--
	S18-19-15	12/20/13		15	--	--	--	--	--	--	--	917 (2)	--	--	--
	S18-19-5	12/20/13		5	--	--	--	--	--	--	--	--	--	--	--
	S18-23-15	1/9/14		15	--	--	--	--	--	--	--	--	--	--	--
	S18-23-20	1/9/14		20	--	--	--	--	--	--	--	--	--	--	--
	S18-3-2	10/4/13		2	--	--	--	--	--	--	--	--	--	--	--
	S18-8-5	12/17/13		5	--	--	--	--	--	--	--	--	--	--	--
CENTRAL REGION															
Processing Area															
SWMU#1	S1-2-2	10/17/13		2	--	--	--	--	--	--	--	8740	--	--	--
SWMU#2	S2-1-0.5	10/18/13		0.5	--	--	--	--	--	--	--	--	--	--	--
SWMU#3	S3-2-0.5	10/18/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S3-2-2	10/18/13		2	--	--	--	--	--	--	--	--	--	--	--
SWMU#4	S4-1-2	10/15/13		2	--	--	--	--	--	--	--	--	--	--	--
	S4-1-INT	10/15/13		16.5	--	--	--	--	--	--	--	--	--	--	--
	S4-2-0.5	10/15/13		0.5	--	420	--	--	--	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs											
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#4	S4-2-10	10/15/13		10	--	--	--	--	--	631	--	--	--	--	--
	S4-2-15	10/15/13		15	--	--	--	--	--	--	--	--	--	--	--
	S4-2-5	10/15/13		5	--	--	--	--	--	651	--	--	--	--	--
Building D															
SWMU#5	DC-21-0.5	10/16/13		0.5	--	--	--	--	--	--	--	1260	--	--	--
	DC-21-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-21-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-22-0.5	10/16/13		0.5	--	--	--	--	--	--	--	1890	--	--	--
	DC-22-2	10/16/13		2	--	--	--	--	--	--	--	928	--	--	--
	DC-23-0.5	10/16/13		0.5	--	--	--	--	--	--	--	2330	--	--	--
	DC-23-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-24-0.5	10/16/13		0.5	--	--	--	--	--	--	--	2360	--	--	--
	DC-24-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-24-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-25-0.5	10/16/13		0.5	--	--	--	--	--	--	--	1230	--	--	--
	DC-25-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-25-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-27-0.5	10/16/13		0.5	--	--	--	--	--	--	--	3980	--	--	--
	DC-27-2	10/16/13		2	--	--	--	--	--	705	--	--	--	--	--
	DC-27-5	10/16/13		5	--	--	--	--	--	424	--	--	--	--	--
	DC-28-0.5	10/16/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-28-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-28-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-0.5	10/17/13	Split	0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-0.5	10/17/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-10	10/17/13	Split	10	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-15	10/17/13	Split	15	--	--	--	--	--	--	--	1150	--	--	--
	DC-SUMP-2	10/17/13	Split	2	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-2	10/17/13		2	--	--	--	--	--	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#5	DC-SUMP-5	10/17/13	Split	5	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-5	10/17/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-Sump-7	10/17/13		7	--	--	--	--	--	--	--	--	--	--	--
	DC-SUMP-	10/17/13	Split	17	--	--	--	--	--	--	--	1770	--	--	--
SWMU#6	DC-26-0.5	10/16/13		0.5	--	--	--	--	--	--	--	6250	--	--	--
	DC-26-2	10/16/13		2	--	--	--	--	--	--	--	2760	--	--	--
	DC-26-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
SWMU#7	DC-1-0.5	10/16/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-1-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-2-0.5	10/10/13		0.5	--	--	--	--	--	1180	--	7810	--	--	--
	DC-2-2	10/10/13		2	--	--	--	--	--	1390	--	881	--	--	--
	DC-2-5	10/10/13		5	--	--	--	--	--	953 (2)	--	1060 (2)	--	--	--
	DC-3-0.5	10/16/13		0.5	--	494	92.5	--	--	599	--	52100	--	--	--
	DC-31-10	12/19/13		10	--	--	--	--	--	--	--	2430 (2)	--	--	--
	DC-31-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	DC-3-2	10/16/13		2	--	281	--	--	--	--	--	4280	--	--	--
	DC-32-10	12/19/13		10	--	--	--	--	--	--	--	6185 E(2)	--	--	--
	DC-32-15	12/19/13		15	--	--	--	--	--	--	--	3326 E(2)	--	--	--
SWMU#8	DC-30-10	12/19/13		10	--	--	--	--	--	--	--	--	--	--	--
	DC-30-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	DC-5-0.5	10/16/13		0.5	--	--	--	--	--	--	--	6160	--	--	--
	DC-5-2	10/16/13		2	--	--	--	--	--	--	--	1210	--	--	--
	DC-5-5	10/16/13		5	--	--	--	--	--	--	--	963 (2)	--	--	--
	DC-6-0.5	10/16/13		0.5	--	--	--	--	--	13000	--	9100	--	--	--
	DC-6-2	10/16/13		2	--	--	--	--	--	7730 E	--	1470	--	--	--
	DC-7-0.5	10/16/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-7-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-7-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--

TABLE 5
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Phase IV RFI Report
Clean Harbors Kansas, LLC

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			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#9	DC-12-0.5	10/9/13		0.5	--	--	--	--	--	--	--	2940 (2)	--	--	--
	DC-12-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-13-0.5	10/16/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-13-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-13-5	10/16/13		5	--	--	--	--	--	--	--	--	--	--	--
	DC-15-0.5	10/9/13		0.5	--	--	--	--	--	--	--	3850	--	--	--
	DC-15-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-16-0.5	10/16/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-16-2	10/16/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-16-5	10/16/13		5	--	--	--	--	--	--	--	1850	--	--	--
	DC-17-INT	10/17/13	Split	15.5	--	--	--	--	--	--	--	--	--	--	--
	DC-18-0.5	10/9/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-18-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-20-0.5	10/9/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	DC-20-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
SWMU#10	S10-1-0.5	10/7/13		0.5	--	--	--	--	--	--	--	3680	--	--	--
	S10-1-10	10/7/13		10	10400	--	223 J	--	--	--	--	7250	--	--	--
	S10-1-15	10/7/13		15	--	--	--	--	--	--	--	2030	--	--	--
	S10-1-2	10/7/13		2	--	--	--	--	--	736	--	--	--	--	--
	S10-1-5	10/7/13		5	--	--	--	--	--	1270	--	--	--	--	--
	S10-1-INT	10/7/13	Split	16.5	--	--	--	--	--	--	--	956	--	263 J	--
	S10-2-10	10/10/13		10	--	--	--	--	--	--	--	--	--	--	--
	S10-2-15	10/10/13		15	--	--	--	--	--	--	--	--	--	--	--
	S10-2-5	10/10/13		5	--	--	--	--	--	--	--	--	--	--	--
SWMU#11	S11-1-0.5	10/3/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	S11-10-15	12/20/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-10-5	12/20/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-1-10	10/3/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-11-10	12/20/13		10	--	--	--	--	--	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#11	S11-11-15	12/20/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-1-15	10/3/13		15	--	--	--	--	--	--	--	874 (2)	--	--	--
	S11-1-2	10/3/13		2	--	--	--	--	--	--	--	--	--	--	--
	S11-13-10	1/7/14		10	--	--	--	--	--	--	--	--	--	--	--
	S11-13-5	1/7/14		5	--	--	--	--	--	--	--	--	--	--	--
	S11-1-5	10/3/13		5	--	--	--	--	--	--	--	2070 (2)	--	--	--
	S11-18-15	1/8/14		15	--	--	--	--	--	--	--	--	--	--	--
	S11-19-15	1/8/14		15	--	--	--	--	--	--	--	--	--	--	--
	S11-1-INT	10/3/13		18.5	--	--	--	--	--	--	--	--	--	--	--
	S11-20-15	1/7/14		15	--	--	--	--	--	--	--	--	--	--	--
	S11-2-10	10/3/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-2-15	10/3/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-2-2	10/3/13		2	--	--	--	--	--	--	--	--	--	--	--
	S11-22-15	1/7/14		15	--	--	--	--	--	--	--	--	--	--	--
	S11-2-5	10/3/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-3-15	10/11/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-3-INT	10/11/13		16	--	--	--	--	--	--	--	--	--	--	--
	S11-4-10	12/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-4-15	12/18/13		15	--	--	--	--	--	--	--	2425 (2)	--	--	--
	S11-4-2	12/18/13		2	--	--	--	--	--	--	--	1499 (2)	--	--	--
	S11-4-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-5-10	12/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-5-15	12/18/13		15	--	--	--	--	--	--	--	1657 (2)	--	--	--
	S11-5-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	S11-5-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-6-10	12/18/13		10	--	--	--	--	--	--	--	1340 (2)	--	--	--
	S11-6-15	12/18/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-6-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	S11-6-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--

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DRAFT

			Parameter:		VOCs											
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
				IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SWMU#11	S11-7-10	12/20/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-7-15	12/20/13		15	--	--	--	--	--	--	--	--	--	--	--
	S11-7-5	12/20/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-8-10	12/20/13		10	--	--	--	--	--	--	--	--	--	--	--
	S11-8-15	12/20/13		15	--	--	--	--	--	--	--	1423 (2)	--	--	--
	S11-8-5	12/20/13		5	--	--	--	--	--	--	--	--	--	--	--
	S11-9-15	12/20/13		15	--	--	--	--	--	--	--	888 (2)	--	--	--
SWMU#21	DC-19-0.5	10/9/13		0.5	--	--	--	--	--	--	--	2930	--	--	--
	DC-19-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
	DC-19-5	10/9/13		5	--	--	--	--	--	--	--	--	--	--	--
Building B and Former Paint Can Pit															
SWMU#16	BC-2-0.5	10/17/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	BC-2-2	10/17/13		2	--	--	--	--	--	--	--	--	--	--	--
	BC-4-0.5	10/17/13		0.5	--	--	--	--	--	--	--	--	--	--	--
SWMU#20	S20-2-15	12/17/13		15	--	--	--	1230000	330000	--	--	--	98700	--	179000
	S20-3-15	12/17/13		15	--	--	--	35300	8290	--	--	--	--	--	--
EASTERN REGION															
Building J															
SWMU#15	JC-3-10	10/18/13	Split	10	--	--	--	--	--	--	--	--	--	--	--
	JC-3-10	10/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	JC-5-5	10/18/13		5	--	--	--	--	--	--	--	--	--	--	--
	JC-7-10	10/18/13	Split	10	--	--	--	--	--	--	--	--	--	--	--
	JC-7-10	10/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	JC-9-10	10/18/13	Split	10	--	--	--	--	--	--	--	--	--	--	--
	JC-9-10	10/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	JC-9-2	10/18/13		2	--	--	--	--	--	--	--	--	--	--	--
Area South of Building J															
South Bldg J	SEBJ-1-10	10/3/13		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-1-15	10/3/13		15	--	--	--	--	--	--	--	--	--	--	--

TABLE 5
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DRAFT

RFI Investigation Area	Sample	Sample Date	Parameter: Type	IAO: Depth	VOCs: 1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
					2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
					ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
South Bldg J	SEBJ-12-10	1/8/14		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-1-INT	10/3/13		17	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-4-10	12/19/13		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-4-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-5-10	12/19/13		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-5-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-6-15	12/19/13		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-7-10	12/18/13		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-7-15	12/18/13		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-8-10	1/6/14		10	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-8-15	1/6/14		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-8-20	1/6/14		20	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-8-5	1/6/14		5	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-9-15	1/6/14		15	--	--	--	--	--	--	--	--	--	--	--
	SEBJ-9-20	1/6/14		20	--	--	--	--	--	--	--	--	--	--	--
Area North of Building J															
North Bldg J	NBJ-1-2	10/7/13		2	--	--	--	--	--	--	--	1290 (2)	--	--	450 (2)
	NBJ-1-5	10/7/13		5	--	--	--	1800 (2)	--	--	--	17000 (2)	--	--	367 (2)
Building I and Former Still Area															
SWMU#22	S22-2-0.5	10/9/13		0.5	--	--	--	11300	--	--	--	--	--	--	--
	S22-2-2	10/9/13		2	--	--	--	8590	--	--	--	--	--	--	996
	S22-2-5	10/9/13	Split	5	--	--	--	6140	--	--	--	1010	--	--	424
	S22-2-5	10/9/13		5	--	--	--	14700	--	--	7250	1060	90700	--	737
Transects	T5-4-20	10/11/13		20	--	--	--	--	--	--	--	--	--	--	--
Northeastern Corner of Facility															
AOC-10	A10-1-5	10/2/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-2-0.5	10/2/13		0.5	--	--	--	--	--	--	--	--	--	--	--
	A10-2-17	10/2/13		17	--	--	--	--	--	--	--	--	--	--	--
	A10-2-INT	10/11/13		18	--	--	--	--	--	--	--	--	--	--	--

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			Parameter:		VOCs										
					1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,4-Dioxane	4-Methyl-2-Pentanone	Cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	Naphthalene
		Sample		IAO:	2800[1]	269[1]	85.9[1]	1070[1]	5510[1]	384[1]	6690[1]	855[1]	65600[1]	42.9[1]	349[1]
RFI Investigation Area	Sample	Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
AOC-10	A10-3-2	10/3/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-3-5	10/3/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-4-10	10/1/13		10	--	--	--	--	--	--	--	--	--	--	--
	A10-4-15	10/1/13		15	--	--	--	--	--	--	--	--	--	--	--
	A10-4-2	10/1/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-4-5	10/1/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-5-2	10/3/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-6-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-6-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-10-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-10-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-12-10	12/19/13		10	--	--	--	--	--	--	--	--	--	--	--
	A10-12-5	12/19/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-13-5	12/19/13		5	--	--	--	--	--	--	--	--	--	--	--
	A10-9-2	12/18/13		2	--	--	--	--	--	--	--	--	--	--	--
	A10-9-5	12/18/13		5	--	--	--	--	--	--	--	--	--	--	--
Area West of Builiding I															
AOC#12	A12-3-10	10/9/13		10	--	--	--	107000	51300	--	--	57300	881000	--	4960
	A12-3-2	10/9/13		2	--	--	--	34400	14300	--	--	--	--	--	2000
	A12-3-5	10/9/13		5	--	--	--	2720	--	--	--	1870	--	--	--
	A12-7-15	12/17/13		15	--	--	--	1950	--	--	--	--	--	--	--
	A12-8-10	12/17/13		10	--	--	--	83400	32700	--	--	--	831000	--	--
	A12-8-5	12/17/13		5	--	--	--	--	--	--	--	--	--	--	--
Transects	T8-1D-22	10/14/13		22	--	--	--	65700	19600	--	--	--	--	--	5210

-- indicates that there was not an exceedence of the IAO for the associated parameter

(2) Validation Flag - J Estimated

J - Laboratory flag - > Method detection limit but < laboratory reporting limit

E- Laboratory flag - Estimated - result is outside instrument calibration range

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DRAFT

			Parameter:		VOCs								SVOCs	Metals	
					N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
WESTERN REGION															
SWMU#13	S13-1-5	10/10/13		5	--	--	--	--	148	--	--	--	--	--	--
	S13-2-0.5	10/10/13		0.5	--	--	--	--	53400	--	--	--	--	--	--
	S13-2-2	10/10/13		3	--	--	--	--	1670	--	--	--	--	--	--
	S13-2-5	10/10/13		5	--	--	--	--	310	--	--	--	--	--	--
	S13-2-INT	10/10/13		16	--	--	--	--	394	--	--	--	--	--	--
	S13-4-2	10/10/13		2	--	--	--	--	4750	--	--	--	--	--	--
SWMU#14	S14-3-0.5	10/8/13		0.5	--	--	--	--	871	--	--	--	--	--	--
	S14-4-0.5	10/7/13		0.5	--	--	--	--	2240	--	31700	--	--	--	--
	S14-4-15	10/7/13		15	--	--	--	--	--	--	89.9	--	--	--	--
	S14-4-2	10/7/13		2	--	--	--	--	--	--	851	--	--	--	--
	S14-4-5	10/7/13		5	--	--	--	--	--	--	445	--	--	--	--
	S14-4-INT	10/7/13		14.8	--	--	--	--	--	--	221 J	--	--	--	--
	S14-5-0.5	10/7/13		0.5	--	--	--	--	--	--	145 (2)	--	--	--	--
	S14-7-0.5	12/19/13		0.5	--	--	--	--	137	--	--	--	--	--	--
	S14-8-0.5	12/19/13		0.5	--	--	--	--	--	--	171 (2)	--	--	--	--
	S14-8-10	12/19/13		10	--	--	--	--	253 (2)	--	--	--	--	--	--
	S14-8-5	12/19/13		5	--	--	--	--	234 (2)	--	--	--	--	--	--
	S14-9-15	12/20/13		15	--	--	--	--	231 (2)	--	--	--	--	--	--
	S14-9-2	12/20/13		2	--	--	--	--	--	--	163 (2)	--	--	--	--
SWMU#24	S24-3-15-INT	10/8/13		15	--	--	--	--	503 (2)	--	--	--	--	--	--
	S24-3-2	10/8/13		2	--	--	--	--	109000	--	11900	--	--	--	--
	S24-3-5	10/8/13		5	--	--	--	--	1820	--	--	--	--	--	--
	S24-3-10	10/8/13		10	--	--	--	--	2350	--	--	--	--	--	--
Former Dry Solids Gondola															
SWMU#17	S17-1-10	10/7/13		10	--	--	--	--	794 (2)	--	--	--	--	--	--
	S17-1-10	10/7/13		10	--	--	--	--	622	--	--	--	--	--	--
	S17-1-15	10/7/13		15	--	--	--	--	5330	--	--	--	--	--	--
	S17-1-2	10/7/13		2	--	--	--	--	2800	--	--	--	--	--	--

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					N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
		Sample		IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#17	S17-1-5	10/7/13		5	--	--	--	--	170	--	--	--	--	--	--
	S17-1-INT	10/7/13		13	--	--	--	--	1540	--	--	--	--	--	--
	S18-1-15	10/7/13		15	--	--	--	--	982 (2)	--	--	--	--	--	--
	S18-1-15	10/7/13		15	--	--	--	--	1330	--	--	--	--	--	--
Trailer Parking and Southwestern Corner															
SWMU#18	S18-10-2	12/17/13		2	--	--	--	--	145 (2)	--	--	--	--	--	--
	S18-11-15	12/19/13		15	--	--	--	--	1920 E(2)	--	--	--	--	--	--
	S18-11-5	12/19/13		5	--	--	--	--	29500 E(2)	--	--	--	--	--	--
	S18-14-2	12/19/13		2	--	--	--	--	210 (2)	--	--	--	--	--	--
	S18-16-2	12/18/13		2	--	--	--	--	256 (2)	--	--	--	--	--	--
	S18-17-2	12/18/13		2	--	--	--	--	314 (2)	--	--	--	--	--	--
	S18-18-15	12/18/13		15	--	--	--	--	368 (2)	--	--	--	--	--	--
	S18-18-5	12/18/13		5	--	--	--	--	1030 (2)	--	--	--	--	--	--
	S18-19-10	12/20/13		10	--	--	--	--	2029 (2)	--	--	--	--	--	--
	S18-19-15	12/20/13		15	--	--	--	--	2093 (2)	--	--	--	--	--	--
	S18-19-5	12/20/13		5	--	--	--	--	683 (2)	--	--	--	--	--	--
	S18-23-15	1/9/14		15	--	--	--	--	157 (2)	--	--	--	--	--	--
	S18-23-20	1/9/14		20	--	--	--	--	8660 E(2)	--	--	--	--	--	--
	S18-3-2	10/4/13		2	--	--	--	--	133	--	--	--	--	--	--
	S18-8-5	12/17/13		5	--	--	--	--	232 (2)	--	--	--	--	--	--
CENTRAL REGION															
Processing Area															
SWMU#1	S1-2-2	10/17/13		2	--	--	--	--	--	--	--	277	--	--	--
SWMU#2	S2-1-0.5	10/18/13		0.5	--	--	--	--	137	--	--	--	--	252	--
SWMU#3	S3-2-0.5	10/18/13		0.5	--	--	--	--	30100	--	22000	--	--	--	--
	S3-2-2	10/18/13		2	--	--	--	--	138	--	84.9	--	--	--	--
SWMU#4	S4-1-2	10/15/13		2	--	--	--	--	132	--	--	--	--	--	--
	S4-1-INT	10/15/13		16.5	--	--	--	--	337	--	--	--	--	--	--
	S4-2-0.5	10/15/13		0.5	--	--	--	--	--	--	--	37.1	--	--	--

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					N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#4	S4-2-10	10/15/13		10	--	--	--	--	3430	--	379	--	--	--	--
	S4-2-15	10/15/13		15	--	--	--	--	12700	--	781	--	--	--	--
	S4-2-5	10/15/13		5	--	--	--	--	4110	--	359	--	--	--	--
Building D															
SWMU#5	DC-21-0.5	10/16/13		0.5	--	--	--	--	14800	--	3480	--	--	--	--
	DC-21-2	10/16/13		2	--	--	--	--	2380	--	482	--	--	--	--
	DC-21-5	10/16/13		5	--	--	--	--	1500 (2)	--	303 (2)	--	--	--	--
	DC-22-0.5	10/16/13		0.5	--	--	--	--	12700	--	5270	--	--	--	--
	DC-22-2	10/16/13		2	--	--	--	--	5430	--	802	--	--	--	--
	DC-23-0.5	10/16/13		0.5	--	--	--	--	20000	--	7370	--	2680	--	--
	DC-23-2	10/16/13		2	--	--	--	--	1540	--	246	--	--	--	--
	DC-24-0.5	10/16/13		0.5	--	--	--	--	39700	--	7990	--	--	--	--
	DC-24-2	10/16/13		2	--	--	--	--	2260	--	422	--	--	--	--
	DC-24-5	10/16/13		5	--	--	--	--	1300	--	196	--	--	--	--
	DC-25-0.5	10/16/13		0.5	--	--	--	--	38100	--	6850	--	--	--	--
	DC-25-2	10/16/13		2	--	--	--	--	7530	--	990	--	--	--	--
	DC-25-5	10/16/13		5	--	--	--	--	1710 (2)	--	258 (2)	--	--	--	--
	DC-27-0.5	10/16/13		0.5	--	--	--	--	58800	--	17400	--	--	--	--
	DC-27-2	10/16/13		2	--	--	--	--	9030	--	1370	--	--	--	--
	DC-27-5	10/16/13		5	--	--	--	--	3400	--	553	--	--	--	--
	DC-28-0.5	10/16/13		0.5	--	--	--	--	10400	--	2600	--	--	--	--
	DC-28-2	10/16/13		2	--	--	--	--	12100	--	1790	--	--	--	--
	DC-28-5	10/16/13		5	--	--	--	--	2750 (2)	--	415 (2)	--	--	--	--
	DC-SUMP-0.5	10/17/13	Split	0.5	--	--	--	--	3380	--	528	--	--	--	--
	DC-SUMP-0.5	10/17/13		0.5	--	--	--	--	9420	--	1040	--	--	--	--
	DC-SUMP-10	10/17/13	Split	10	--	--	--	--	1570	--	90.1	--	--	--	--
	DC-SUMP-15	10/17/13	Split	15	--	--	--	--	2480	--	657	--	--	--	--
	DC-SUMP-2	10/17/13	Split	2	--	--	--	--	10900	--	1130	--	--	--	--
	DC-SUMP-2	10/17/13		2	--	--	--	--	3860	--	616	--	--	--	--

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					VOCs								SVOCs	Metals	
			Parameter:		N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#5	DC-SUMP-5	10/17/13	Split	5	--	--	--	--	2830	--	366	--	--	--	--
	DC-SUMP-5	10/17/13		5	--	--	--	--	3330	--	395	--	--	--	--
	DC-Sump-7	10/17/13		7	--	--	--	--	854	--	--	--	--	--	--
	DC-SUMP-	10/17/13	Split	17	--	--	--	--	8450	--	877	29.4	--	--	--
SWMU#6	DC-26-0.5	10/16/13		0.5	--	--	--	--	48400	--	11600	--	--	--	--
	DC-26-2	10/16/13		2	--	--	--	--	33500	--	5130	--	--	--	--
	DC-26-5	10/16/13		5	--	--	--	--	2290 (2)	--	402 (2)	--	--	--	--
SWMU#7	DC-1-0.5	10/16/13		0.5	--	--	--	--	214 E	--	166	--	--	--	--
	DC-1-2	10/16/13		2	--	--	--	--	2240	--	695	--	--	--	--
	DC-2-0.5	10/10/13		0.5	--	--	--	--	64500	--	16200	--	--	--	--
	DC-2-2	10/10/13		2	--	--	--	--	3310	--	685	--	--	--	--
	DC-2-5	10/10/13		5	--	--	--	--	2490 (2)	--	437 (2)	--	--	--	--
	DC-3-0.5	10/16/13		0.5	--	--	--	--	151000	--	21300	--	--	--	--
	DC-31-10	12/19/13		10	--	--	--	--	2293 (2)	--	270 (2)	--	--	--	--
	DC-31-15	12/19/13		15	--	--	--	--	195 (2)	--	--	--	--	--	--
	DC-3-2	10/16/13		2	--	--	--	--	4980	--	613	--	--	--	--
	DC-32-10	12/19/13		10	--	--	--	--	3370 E(2)	--	598 (2)	--	--	--	--
	DC-32-15	12/19/13		15	--	--	--	--	649 (2)	--	142 (2)	--	--	--	--
SWMU#8	DC-30-10	12/19/13		10	--	--	--	--	771	--	--	--	--	--	--
	DC-30-15	12/19/13		15	--	--	--	--	225 (2)	--	--	--	--	--	--
	DC-5-0.5	10/16/13		0.5	--	--	--	--	37500	--	7970	--	--	--	--
	DC-5-2	10/16/13		2	--	--	--	--	4300	--	995	--	--	--	--
	DC-5-5	10/16/13		5	--	--	--	--	1400 (2)	--	--	--	--	--	--
	DC-6-0.5	10/16/13		0.5	--	--	--	--	44100	--	8470	--	--	--	--
	DC-6-2	10/16/13		2	--	--	--	--	3610	--	590	--	2160	--	--
	DC-7-0.5	10/16/13		0.5	--	--	--	--	9720	--	1860	--	--	--	--
	DC-7-2	10/16/13		2	--	--	--	--	187	--	--	--	--	--	--
	DC-7-5	10/16/13		5	--	--	--	--	1310 (2)	--	--	--	--	--	--

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RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#9	DC-12-0.5	10/9/13		0.5	--	--	--	--	43600 (2)	--	13700 (2)	--	--	--	--
	DC-12-2	10/9/13		2	--	--	--	--	4950	--	742	--	--	--	--
	DC-13-0.5	10/16/13		0.5	--	--	--	--	948	--	155	--	--	--	--
	DC-13-2	10/16/13		2	--	--	--	--	511	--	--	--	--	--	--
	DC-13-5	10/16/13		5	--	--	--	--	329	--	--	--	--	--	--
	DC-15-0.5	10/9/13		0.5	--	--	--	--	30800	--	13700	--	--	--	--
	DC-15-2	10/9/13		2	--	--	--	--	1690	--	499	--	--	--	--
	DC-16-0.5	10/16/13		0.5	--	--	--	--	726	--	107	--	--	--	--
	DC-16-2	10/16/13		2	--	--	--	--	795	--	193	--	--	--	--
	DC-16-5	10/16/13		5	--	--	--	--	18400	--	5600	--	--	--	--
	DC-17-INT	10/17/13	Split	15.5	--	--	--	--	127	--	--	--	--	--	--
	DC-18-0.5	10/9/13		0.5	--	--	--	--	4420	--	889	--	--	--	--
	DC-18-2	10/9/13		2	--	--	--	--	540	--	--	--	--	--	--
	DC-20-0.5	10/9/13		0.5	--	--	--	--	12200 (2)	--	4250 (2)	--	--	--	--
	DC-20-2	10/9/13		2	--	--	--	--	2100 (2)	--	353 (2)	--	--	--	--
SWMU#10	S10-1-0.5	10/7/13		0.5	--	--	--	--	308000	--	22500	--	--	--	--
	S10-1-10	10/7/13		10	--	--	--	--	848000	--	29300	--	--	--	--
	S10-1-15	10/7/13		15	--	--	--	--	15700	--	2100	--	--	--	--
	S10-1-2	10/7/13		2	--	--	--	--	52300	--	2480	--	--	--	--
	S10-1-5	10/7/13		5	--	--	--	--	35500	--	2290	--	--	--	--
	S10-1-INT	10/7/13	Split	16.5	--	--	--	--	13100	--	834	--	--	--	--
	S10-2-10	10/10/13		10	--	--	--	--	3790	--	459	--	--	--	--
	S10-2-15	10/10/13		15	--	--	--	--	3500	--	742	--	--	--	--
	S10-2-5	10/10/13		5	--	--	--	--	3960	--	583	--	--	--	--
SWMU#11	S11-1-0.5	10/3/13		0.5	--	--	--	--	4010 (2)	--	1200 (2)	--	--	--	--
	S11-10-15	12/20/13		15	--	--	--	--	439 (2)	--	--	--	--	--	--
	S11-10-5	12/20/13		5	--	--	--	--	214 (2)	--	--	--	--	--	--
	S11-1-10	10/3/13		10	--	--	--	--	13400 (2)	--	1860 (2)	--	--	--	--
	S11-11-10	12/20/13		10	--	--	--	--	490 (2)	--	93.1 (2)	--	--	--	--

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RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#11	S11-11-15	12/20/13		15	--	--	--	--	1890 (2)	--	420 (2)	--	--	--	--
	S11-1-15	10/3/13		15	--	--	--	--	3780 (2)	--	815 (2)	--	--	--	--
	S11-1-2	10/3/13		2	--	--	--	--	960 (2)	--	333 E(2)	--	--	--	--
	S11-13-10	1/7/14		10	--	--	--	--	396 (2)	--	--	--	--	--	--
	S11-13-5	1/7/14		5	--	--	--	--	223 (2)	--	--	--	--	--	--
	S11-1-5	10/3/13		5	--	--	--	--	40900 (2)	--	6310 (2)	--	--	--	--
	S11-18-15	1/8/14		15	--	--	--	--	150 (2)	--	--	--	--	--	--
	S11-19-15	1/8/14		15	--	--	--	--	209 (2)	--	--	--	--	--	--
	S11-1-INT	10/3/13		18.5	--	--	--	--	1000 (2)	--	110 (2)	--	--	--	--
	S11-20-15	1/7/14		15	--	--	--	--	130 (2)	--	--	--	--	--	--
	S11-2-10	10/3/13		10	--	--	--	--	1570	--	301 J	--	--	--	--
	S11-2-15	10/3/13		15	--	--	--	--	295	--	84.5 J	--	--	--	--
	S11-2-2	10/3/13		2	--	--	--	--	328	--	102	--	--	--	--
	S11-22-15	1/7/14		15	--	--	--	--	304 (2)	--	--	--	--	--	--
	S11-2-5	10/3/13		5	--	--	--	--	779	--	--	--	--	--	--
	S11-3-15	10/11/13		15	--	--	--	--	276	--	--	--	--	--	--
	S11-3-INT	10/11/13		16	--	--	--	--	407	--	--	--	--	--	--
	S11-4-10	12/18/13		10	--	--	--	--	4599 E(2)	--	410 (2)	--	--	--	--
	S11-4-15	12/18/13		15	--	--	--	--	7629 E(2)	--	1386 (2)	--	--	--	--
	S11-4-2	12/18/13		2	--	--	--	--	6357 E(2)	--	662 (2)	--	--	--	--
	S11-4-5	12/18/13		5	--	--	--	--	1376 (2)	--	149 (2)	--	--	--	--
	S11-5-10	12/18/13		10	--	--	--	--	678 (2)	--	147 (2)	--	--	--	--
	S11-5-15	12/18/13		15	--	--	--	--	6450 E(2)	--	1178 (2)	--	--	--	--
	S11-5-2	12/18/13		2	--	--	--	--	2457 (2)	--	284 (2)	--	--	--	--
	S11-5-5	12/18/13		5	--	--	--	--	2594 (2)	--	306 (2)	--	--	--	--
	S11-6-10	12/18/13		10	--	--	--	--	1764 (2)	--	330 (2)	--	--	--	--
	S11-6-15	12/18/13		15	--	--	--	--	1266 (2)	--	134 (2)	--	--	--	--
	S11-6-2	12/18/13		2	--	--	--	--	1348 (2)	--	285 (2)	--	--	--	--
	S11-6-5	12/18/13		5	--	--	--	--	1251 (2)	--	214 (2)	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

					VOCs								SVOCs	Metals	
			Parameter:		N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
SWMU#11	S11-7-10	12/20/13		10	--	--	--	--	349 (2)	--	--	--	--	--	--
	S11-7-15	12/20/13		15	--	--	--	--	1197 (2)	--	177 (2)	--	--	--	--
	S11-7-5	12/20/13		5	--	--	--	--	238 (2)	--	--	--	--	--	--
	S11-8-10	12/20/13		10	--	--	--	--	257 (2)	--	--	--	--	--	--
	S11-8-15	12/20/13		15	--	--	--	--	5439 E(2)	--	1050 (2)	--	--	--	--
	S11-8-5	12/20/13		5	--	--	--	--	222 (2)	--	--	--	--	--	--
	S11-9-15	12/20/13		15	--	--	--	--	358 (2)	--	118 (2)	--	--	--	--
SWMU#21	DC-19-0.5	10/9/13		0.5	--	--	--	--	24900	--	6490	--	--	--	--
	DC-19-2	10/9/13		2	--	--	--	--	1630	--	335	--	--	--	--
	DC-19-5	10/9/13		5	--	--	--	--	784 (2)	--	--	--	--	--	--
Building B and Former Paint Can Pit															
SWMU#16	BC-2-0.5	10/17/13		0.5	--	--	--	--	20300	--	--	--	--	--	--
	BC-2-2	10/17/13		2	--	--	--	--	495	--	--	--	--	--	--
	BC-4-0.5	10/17/13		0.5	--	--	--	--	--	--	--	--	--	175	--
SWMU#20	S20-2-15	12/17/13		15	102000	262000	--	--	--	--	--	--	--	--	--
	S20-3-15	12/17/13		15	--	--	--	--	--	--	--	--	--	--	--
EASTERN REGION															
Building J															
SWMU#15	JC-3-10	10/18/13	Split	10	--	--	--	--	537	--	--	--	--	--	--
	JC-3-10	10/18/13		10	--	--	--	--	308	--	--	--	--	--	--
	JC-5-5	10/18/13		5	--	--	--	--	1710	--	--	--	--	--	--
	JC-7-10	10/18/13	Split	10	--	--	--	--	253	--	--	--	--	--	--
	JC-7-10	10/18/13		10	--	--	--	--	128	--	--	--	--	--	--
	JC-9-10	10/18/13	Split	10	--	--	--	--	297	--	--	--	--	--	--
	JC-9-10	10/18/13		10	--	--	--	--	257	--	--	--	--	--	--
	JC-9-2	10/18/13		2	--	--	--	--	485	--	--	--	--	--	--
Area South of Building J															
South Bldg J	SEBJ-1-10	10/3/13		10	--	--	--	--	145	--	--	--	--	--	--
	SEBJ-1-15	10/3/13		15	--	--	--	--	341	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs								SVOCs	Metals	
					N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	**Sample**	**Sample Date**	**Type**	**Depth**	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
South Bldg J	SEBJ-12-10	1/8/14		10	--	--	--	--	122 (2)	--	--	--	--	--	--
	SEBJ-1-INT	10/3/13		17	--	--	--	--	440	--	--	--	--	--	--
	SEBJ-4-10	12/19/13		10	--	--	--	--	230 (2)	--	--	--	--	--	--
	SEBJ-4-15	12/19/13		15	--	--	--	--	300 (2)	--	--	--	--	--	--
	SEBJ-5-10	12/19/13		10	--	--	--	--	133 (2)	--	--	--	--	--	--
	SEBJ-5-15	12/19/13		15	--	--	--	--	1460	--	--	--	--	--	--
	SEBJ-6-15	12/19/13		15	--	--	--	--	155	--	--	--	--	--	--
	SEBJ-7-10	12/18/13		10	--	--	--	--	125 (2)	--	--	--	--	--	--
	SEBJ-7-15	12/18/13		15	--	--	--	--	557 (2)	--	--	--	--	--	--
	SEBJ-8-10	1/6/14		10	--	--	--	--	172	--	--	--	--	--	--
	SEBJ-8-15	1/6/14		15	--	--	--	--	980 (2)	--	--	--	--	--	--
	SEBJ-8-20	1/6/14		20	--	--	--	--	246 (2)	--	--	--	--	--	--
	SEBJ-8-5	1/6/14		5	--	--	--	--	647 (2)	--	--	--	--	--	--
	SEBJ-9-15	1/6/14		15	--	--	--	--	464 (2)	--	--	--	--	--	--
	SEBJ-9-20	1/6/14		20	--	--	--	--	195 (2)	--	--	--	--	--	--
Area North of Building J															
North Bldg J	NBJ-1-2	10/7/13		2	--	--	--	--	--	--	--	371 (2)	--	--	--
	NBJ-1-5	10/7/13		5	--	--	--	--	--	--	--	2160 (2)	--	--	--
Building I and Former Still Area															
SWMU#22	S22-2-0.5	10/9/13		0.5	--	--	--	--	--	--	--	29.2	--	--	--
	S22-2-2	10/9/13		2	--	--	--	--	--	--	--	--	--	--	--
	S22-2-5	10/9/13	Split	5	--	--	--	--	313 J	--	--	--	--	--	--
	S22-2-5	10/9/13		5	--	--	--	--	613	66400	--	--	--	--	--
Transects	T5-4-20	10/11/13		20	--	--	--	--	--	--	--	59.9	--	--	--
Northeastern Corner of Facility															
AOC-10	A10-1-5	10/2/13		5	--	--	--	--	--	--	175	--	--	--	--
	A10-2-0.5	10/2/13		0.5	--	--	--	--	--	--	--	--	--	197	--
	A10-2-17	10/2/13		17	--	--	--	--	125	--	--	--	--	--	--
	A10-2-INT	10/11/13		18	--	--	--	--	289	--	--	--	--	--	--

TABLE 5
Summary of Soil Exceedances of the IAO
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

			Parameter:		VOCs								SVOCs	Metals	
					N-Butylbenzene	N-Propylbenzene	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trichloroethene	Vinyl Chloride	Aniline	Chromium (Total)	Lead (Total)
				IAO:	50900[I]	110000[I]	809000[I]	9340[I]	121[I]	51200[I]	84.2[I]	20.5[I]	1950[I]	111[II]	1000[II]
RFI Investigation Area	Sample	Sample Date	Type	Depth	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	mg/kg
AOC-10	A10-3-2	10/3/13		2	--	--	--	--	--	--	--	--	--	115	--
	A10-3-5	10/3/13		5	--	--	--	--	166	--	--	--	--	--	--
	A10-4-10	10/1/13		10	--	--	--	--	2480	--	--	--	--	--	--
	A10-4-15	10/1/13		15	--	--	--	--	--	--	--	--	--	--	1710
	A10-4-2	10/1/13		2	--	--	--	--	8620	--	--	--	--	164	--
	A10-4-5	10/1/13		5	--	--	--	--	10000	--	--	--	--	--	4970
	A10-5-2	10/3/13		2	--	--	--	--	557	--	--	--	--	--	--
	A10-6-2	12/18/13		2	--	--	--	--	370 (2)	--	--	--	--	--	1710
	A10-6-2	12/18/13		2	--	--	--	--	370 (2)	--	--	--	--	--	--
	A10-10-2	12/18/13		2	--	--	--	--	238 (2)	--	--	--	--	--	--
	A10-10-5	12/18/13		5	--	--	--	--	235 (2)	--	--	--	--	--	--
	A10-12-10	12/19/13		10	--	--	--	--	134 (2)	--	--	--	--	--	--
	A10-12-5	12/19/13		5	--	--	--	--	137 (2)	--	--	--	--	--	--
	A10-13-5	12/19/13		5	--	--	--	--	199 (2)	--	--	--	--	--	--
	A10-9-2	12/18/13		2	--	--	--	--	338 (2)	--	--	--	--	--	--
	A10-9-5	12/18/13		5	--	--	--	--	293 (2)	--	--	--	--	--	--
Area West of Builiding I															
AOC#12	A12-3-10	10/9/13		10	--	--	1090000	13200	277000	1130000	28200	--	--	--	--
	A12-3-2	10/9/13		2	--	--	--	--	936	--	1340	--	--	--	--
	A12-3-5	10/9/13		5	--	--	--	--	--	--	--	81.4	--	--	--
	A12-7-15	12/17/13		15	--	--	--	--	--	--	--	--	--	--	--
	A12-8-10	12/17/13		10	--	--	--	--	1008 (2)	612000	--	--	--	--	--
	A12-8-5	12/17/13		5	--	--	--	--	445 (2)	--	--	--	--	--	--
Transects	T8-1D-22	10/14/13		22	--	--	--	--	--	--	--	--	--	--	--

-- indicates that there was not an exceedence of the IAO for the associated parameter

(2) Validation Flag - J Estimated

J - Laboratory flag - > Method detection limit but < laboratory reporting limit

E- Laboratory flag - Estimated - result is outside instrument calibration range

TABLE 6
Summary of Geotechnical Analyses and Results
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

	Soil Classification	Wet Bulk Denisty	Dry Bulk Density	Particle Size Distribution			Intrinsic Permeability	Resistivity	Moisture Content	Specifc Gravity	Total Porosity
Units	-	pcf	pcf	% finer No 4 sieve	% finer No 200 sieve	% finer 0.005 mm	cm/sec	ohms/cm	%	-	%
Samples from the uppermost Clay Unit											
S18-4D-5	CL	120.5	98.1	100.0	91.3	38.5	-	1,188	22.9	2.67	41
S18-5D-5	CL	131.6	110.9	100.0	91.0	32.5	3.3E-08	15,113	18.6	2.69	34
T6-2-5	CL	127.0	102.9	100.0	87.1	45.0	7.3E-08	-	23.4	2.67	38
Samples from the upper sand unit											
S11-1A-5	SC	105.3	86.4	100.0	42.5	19.0	-	3,981	21.9	2.69	49
S11-1A-15	SP-SM	92.5	75.8	100.0	5.6	2.0	-	10,569	22.0	2.65	54
S11-1A-20	SC	113.9	83.1	89.0	13.4	9.8	1.8E-08	-	36.9	2.69	50
T6-2-15	ML	116.0	94.8	100.0	77.9	20.0	-	1,279	22.4	2.70	43
T6-2-25	SC	122.2	104.3	92.4	34.3	25.5	-	2,325	17.2	2.68	38
S18-4D-15	SP	122.8	105.2	99.8	4.7	1.0	-	18,600	16.7	2.66	37
S18-4D-20	SC	116.1	98.9	72.6	19.4	17.0	-	2,389	17.4	2.67	41
S18-5D-15	SC	133.4	113.2	100.0	46.2	28.0	1.4E-08	-	17.8	2.67	32
S18-5D-20	SP	125.3	108.7	96.3	2.6	1.4	-	-	15.2	2.63	34
Samples from the intermediate Clay Unit											
T6-2-Clay	CL	121.4	92.4	100.0	96.7	63.0	1.7E-08	-	31.3	2.71	45
Samples from the lower sand unit											
S18-5D-Low	SP	124.1	110.0	96.7	1.8	1.6	-	18,600	12.9	2.64	33

pcf = pounds per cubic feet
cm/sec = centimeters per second
ohms/cm = ohms per centimeter
SC = Clayey Sand
CL = Clay
ML = Silt
SP = Poorly Graded Sand
SM = Silty Sand
SP-SM = Poorly Graded Sand with Silt

TABLE 7

Summary of Groundwater Exceedances October 2013
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

		VOCs										Metals				
Parameter:		1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Cis-1,2-Dichloroethene	Ethylbenzene	Naphthalene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Arsenic (Total)	Barium (Total)	Chromium (Total)	Lead (Total)	Manganese (Total)
KDHERES Groundwater:		25	7	8.44	44	70	700	1.11	5	5	2	10	2000	100	15	50
USEPA PRG MCL:		NA	7	NA	NA	70	700	NA	5	5	2	10	2000	100	15	NA
Unit:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Sample ID	Date															
Upper Zone																
A10-3	10/3/13	--	--	--	--	--	--	--	10	--	--	--	--	--	29.3	--
A10-4	10/1/13	--	-	--	--	--	--	--	--	--	--	105	3,540	343	762	16,100
A10-5	10/3/13	46	--	--	--	--	--	--	8.1	5.6	--	--	--	--	--	--
A12-3	10/9/13	--	--	--	--	--	--	--	6.5	--	--	--	--	--	--	--
BC-2	10/17/13	--	--	--	--	--	--	--	31.8	6.6	--	--	--	--	--	--
DC-17	10/9/13	--	--	--	--	70.4	--	--	60.1	26.2	--	--	--	--	--	--
DC-17 DUP	10/9/13	--	--	--	--	--	--	--	65	27.1	--	--	--	--	--	--
DC-3	10/16/13	26.2	8.5	--	--	1,710	--	--	38.4	19.5	22.3	--	--	--	--	--
DC-6	10/16/13	--	--	--	--	--	--	--	11.4	--	--	--	--	--	--	--
DC-SUMP	10/17/13	--	--	--	--	183	--	--	6.3	7.1	23.3	--	--	--	--	--
JC-11	10/18/13	--	--	--	--	--	--	--	--	8.1	--	--	--	--	--	--
JC-3	10/18/13	--	--	--	--	--	--	--	--	--	3.2	--	--	--	--	--
JC-5	10/18/13	--	--	--	--	--	--	--	--	7.1	--	--	--	--	--	--
JC-5a	10/18/13	--	--	--	--	--	--	--	6.3	--	--	--	--	--	--	--
JC-7	10/18/13	--	--	--	--	--	--	--	--	5.8	--	--	--	--	--	--
NBJ-1	10/7/13	--	--	--	--	--	--	--	18.9	19.8	5	--	--	--	--	--
NBJ-1 DUP	10/7/13	--	--	--	--	--	--	--	18.2	18.9	5.2	--	--	--	--	--
NBJ-1a	10/14/13	--	--	--	--	--	--	--	--	13	--	--	--	--	--	--
S10-1	10/7/13	--	--	--	--	--	--	--	49.4	--	--	30	--	130	65.9	--
S10-1 DUP	10/7/13	--	--	--	--	--	--	--	45.3	--	--	--	--	--	--	--
S1-1	10/8/13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S11-1	10/4/13	--	--	--	--	--	--	--	--	--	--	17.6	--	--	--	--
S11-1a	10/16/13	--	--	--	--	--	--	--	7.1	--	--	--	--	--	--	--
S11-2	10/3/13	--	--	--	--	403	--	--	21	10.8	102	--	--	--	--	--
S13-1	10/10/13	--	--	--	--	--	--	--	--	9.1	--	--	--	--	21.7	--
S13-1 DUP	10/10/13	--	--	--	--	--	--	--	--	9.4	--	--	--	--	--	--
S13-2	10/10/13	--	--	--	--	--	--	--	--	7.3	--	--	--	--	42.2	--
S13-2 DUP	10/10/13	--	--	--	--	--	--	--	--	8.5	--	--	--	--	--	--
S13-3	10/8/13	--	--	--	--	--	--	--	--	--	--	19.5	--	--	88.9	--
S14-4	10/7/13	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--
S17-1	10/7/13	--	--	--	--	--	--	--	146	9.5	--	--	--	--	--	--
S17-1 DUP	10/7/13	--	--	--	--	--	--	--	149	9.7	--	--	--	--	--	--
S17-1a	10/7/13	--	--	--	--	--	--	--	13.6	28.3	--	--	--	--	--	--
S17-2	10/4/13	--	--	--	--	--	--	--	114	19.5	--	--	--	--	--	--
S17-2 DUP	10/4/13	--	--	--	--	--	--	--	119	21.3	--	--	--	--	--	--
S18-1	10/7/13	--	--	--	--	--	--	--	152	95.9	--	--	--	--	--	--
S18-1 DUP	10/7/13	--	--	--	--	--	--	--	150	91.2	--	--	--	--	--	--
S18-2	10/7/13	--	--	--	--	--	--	--	8.7	--	--	--	--	--	--	--
S18-2 DUP	10/7/13	--	--	--	--	--	--	--	8.4	--	--	--	--	--	--	--
S18-4	10/7/13	--	--	--	--	--	--	--	--	10	--	--	--	--	--	1330

TABLE 7
Summary of Groundwater Exceedances October 2013
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

		VOCs										Metals				
Parameter:		1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Cis-1,2-Dichloroethene	Ethylbenzene	Naphthalene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Arsenic (Total)	Barium (Total)	Chromium (Total)	Lead (Total)	Manganese (Total)
KDHERES Groundwater:		25	7	8.44	44	70	700	1.11	5	5	2	10	2000	100	15	50
USEPA PRG MCL:		NA	7	NA	NA	70	700	NA	5	5	2	10	2000	100	15	NA
Unit:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Sample ID	Date															
S18-4 DUP	10/7/13	--	--	--	--	--	--	--	--	9.3	--	--	--	--	--	--
S18.5	10/7/13	--	--	--	--	--	--	--	14	--	--	--	--	--	--	--
S20-1	10/7/13	--	--	--	--	--	--	--	--	8.4	--	16	--	--	17.2	--
S2-1	10/18/13	--	--	--	--	--	--	--	--	--	--	12.4	--	--	19.6	--
S24-1	10/10/13	--	--	--	--	--	--	--	19.2	--	--	--	--	--	--	--
S24-2	10/8/13	--	--	--	--	--	--	--	9.7	--	--	--	--	--	--	--
S24-4	10/10/13	--	--	--	--	--	--	--	32.9	--	--	--	--	--	--	--
SEBJ-1	10/3/13	--	--	--	--	100	--	--	219	26.1	--	--	--	--	--	--
SEBJ-2	10/4/13	--	--	--	--	--	--	--	--	--	4.3	--	--	--	--	--
SEBJ-2 DUP	10/4/13	--	--	--	--	--	--	--	--	--	4.1	--	--	--	--	--
SEBJ-3	10/3/13	--	--	--	--	436	--	--	281	58.1	--	--	--	--	--	--
T1-1	10/7/13	--	--	--	--	--	--	--	6.2	--	--	--	--	--	--	--
T3-1	10/3/13	--	--	--	--	--	--	--	92.3	21.5	--	--	--	--	--	--
T3-2	10/7/13	--	--	--	--	--	--	--	30.6	7.4	--	--	--	--	--	--
T3-2 DUP	10/7/13	--	--	--	--	--	--	--	31.1	7.6	--	--	--	--	--	--
T4-1	10/2/13	--	--	--	--	--	--	--	6.7	7.8	--	--	--	--	--	--
T4-2	10/3/13	--	--	--	--	77.4	--	--	10.8	--	3.7	--	--	--	--	--
T6-2	10/17/13	--	--	--	--	--	--	--	--	--	--	31.2	--	121	108	7,390
T7-1	10/3/13	--	--	--	--	--	--	--	--	--	2.6	--	--	--	--	--
T7-2	10/1/13	108	--	--	--	82.8	--	--	--	8.6	14.2	--	--	--	--	--
T8-0	10/4/13	--	--	--	--	--	--	--	--	26.4	3.1	--	--	--	--	--
T8-0 DUP	10/4/13	--	--	--	--	--	--	--	--	24.4	2.9	--	--	--	--	--
T8-1	10/4/13	--	--	2,000	506	243	1,940	375	--	--	95.1	--	--	--	--	--
T8-1 DUP	10/4/13	--	--	1,970	518	273	2,020	317	--	--	109	--	--	--	--	--
T8-2	10/4/13	--	--	--	--	--	--	--	--	5.9	--	--	--	--	--	--
T8-2 DUP	10/4/13	--	--	--	--	--	--	--	--	6.6	--	--	--	--	--	--
T8-3	10/4/13	--	--	--	--	95	--	--	158	30.3	--	--	--	--	--	--
T8-3 DUP	10/4/13	--	--	--	--	83.4	--	--	121	29.1	--	--	--	--	--	--
T8-4	10/4/13	86.6	--	--	--	--	--	--	14.4	6.5	--	--	--	--	--	--
T8-4 DUP	10/4/13	83.6	7.2	--	--	--	--	--	14.2	6.3	--	--	--	--	--	--
SK-1S*	10/19/13	--	--	--	--	--	--	--	--	87	--	NA	NA	NA	NA	NA
SK-2S*	10/20/13	--	--	--	--	265	--	--	448	129	--	NA	NA	NA	NA	NA
SK-2S DUP*	10/20/13					276	--	--	425	134	--	NA	NA	NA	NA	NA
SK-3S*	10/20/13	--	--	--	--	--	--	--	--	23	--	NA	NA	NA	NA	NA
SK-4S*	10/20/13	--	--	--	--	--	--	--	42.6	7	--	NA	NA	NA	NA	NA
SK-5S*	10/20/13	--	--	--	--	--	--	--	47.8	12.3	--	NA	NA	NA	NA	NA
SK-8S*	10/19/13	--	--	--	--	--	--	--	--	5.2	--	NA	NA	NA	NA	NA
SK-10S*	10/19/13	--	--	--	--	--	--	--	--	--	2.7	NA	NA	NA	NA	NA
SK-11S*	10/19/13	--	--	--	--	115	--	--	17.8	40.5	9.2	NA	NA	NA	NA	NA
SK-12S*	10/20/13	--	--	--	--	--	--	--	84.1	32.6	--	NA	NA	NA	NA	NA

TABLE 7

Summary of Groundwater Exceedances October 2013
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

		VOCs										Metals				
Parameter:		1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Cis-1,2-Dichloroethene	Ethylbenzene	Naphthalene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Arsenic (Total)	Barium (Total)	Chromium (Total)	Lead (Total)	Manganese (Total)
KDHERES Groundwater:		25	7	8.44	44	70	700	1.11	5	5	2	10	2000	100	15	50
USEPA PRG MCL:		NA	7	NA	NA	70	700	NA	5	5	2	10	2000	100	15	NA
Unit:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Sample ID	**Date**															
SK-B92*	10/20/13	--	--	--	--	--	--	--	153	8.4	--	NA	NA	NA	NA	NA
MW-10*	10/19/13	--	--	--	--	--	--	28.8	--	--	--	NA	NA	NA	NA	NA
MW-15*	10/19/13	--	--	--	--	--	--	--	--	18.1	--	NA	NA	NA	NA	NA
Lower Zone																
A12-1-Lower	10/17/13	--	--	--	--	--	--	--	--	110	--	--	--	--	--	--
T8-1D	10/14/13	--	--	--	--	--	--	1.3	--	98	--	--	--	--	--	--
T8-2D	10/14/13	--	--	--	--	--	--	--	--	63.2	--	--	--	--	--	--
SK-1D*	10/19/13	--	--	--	--	--	--	--	--	131	--	NA	NA	NA	NA	NA
SK-2D*	10/20/13	--	--	--	--	--	--	--	--	48.6	--	NA	NA	NA	NA	NA
SK-3D*	10/20/13	--	--	--	--	--	--	--	--	13.4	--	NA	NA	NA	NA	NA
SK-4D*	10/20/13	--	--	--	--	--	--	--	--	26.4	--	NA	NA	NA	NA	NA
SK-5D*	10/20/13	--	--	--	--	--	--	--	--	38.1	--	NA	NA	NA	NA	NA
SK-7D*	10/19/13	--	--	--	--	--	--	--	--	31.4	--	NA	NA	NA	NA	NA
SK-8D*	10/19/13	--	--	--	--	--	--	--	--	132	--	NA	NA	NA	NA	NA
SK-9D*	10/19/13	--	--	--	--	--	--	--	--	18.9	--	NA	NA	NA	NA	NA
SK-12D*	10/20/13	--	--	--	--	--	--	--	--	31.2	--	NA	NA	NA	NA	NA
WND-32DR*	10/19/13	--	--	--	--	--	--	--	--	22.2	--	NA	NA	NA	NA	NA
HR1-03*	10/20/13	--	--	--	--	--	--	--	--	20.4	--	NA	NA	NA	NA	NA
RSC-1*	10/19/13	--	--	--	--	--	--	--	--	146	--	NA	NA	NA	NA	NA
RSC-1 DUP*	10/19/13	--	--	--	--	--	--	--	--	134	--	NA	NA	NA	NA	NA

ug/l - micrograms per liter
KDHERES - Kansas Department of Health and Environmental Residiential Goals (October 2010)
USEPA PRG MCL-United States Environmental Protection Agency (USEPA), Preliminary Remediation Goals (PRG), Maximum Contaminant Level (MCL) (May 2009
-- indicates that there was not an exceedence of the MCL for the associated parameter
NA - sample not analyzed for the associated parameter
* - sample collected during October 2013 semi-annual sampling event

Table 8
Vertical VOC distribution in Upper Zone Groundwater
Clean Harbors Wichita

Sample Location	Sample ID	Sampling Method	Depth Interval (ft. bgs)	Concentration (ug/L Tetrachloroethene	Trichl
SK-1S	SK-1S	SAP (3 volume purge)	11-5 - 26.5	4.9	
	SK-1S	RFI (Low Flow Purge)	17	0.78 J	
	SK-1S-2-Hydrasleeve	Hydrasleeve	16-18	7.2	
	SK-1S-4-Hydrasleeve	Hydrasleeve	18-20	6.2	
	SK-1S-6-Hydrasleeve	Hydrasleeve	20-22	4.3	1
	SK-1S-8-Hydrasleeve	Hydrasleeve	22-24	3.6	
	SK-1S-10-Hydrasleeve	Hydrasleeve	24-26	1.8	1
	SK-1S-Ver-2	Hydropunch	16-18	57.7	
	SK-1S-Ver-4	Hydropunch	18-20	3.0 J	1
	SK-1S-Ver-6	Hydropunch	20-22	<1 .0	
	SK-1S-Ver-8	Hydropunch	22-24	0.81 J	
SK-2S	SK-2S	SAP (3 volume purge)	10.75 - 25.75	448	
	SK-2S	RFI (Low Flow Purge)	15	2.2	
	SK-2S-2-Hydrasleeve	Hydrasleeve	14-16	2.1	
	SK-2S-4-Hydrasleeve	Hydrasleeve	16-18	2.1	
	SK-2S-6-Hydrasleeve	Hydrasleeve	18-20	1.9	
	SK-2S-8-Hydrasleeve	Hydrasleeve	20-22	2	
	SK-2S-10-Hydrasleeve	Hydrasleeve	22-24	1.9	
	SK-2S-Ver-2	Hydropunch	14-16	377 J	1
	SK-2S-Ver-4	Hydropunch	16-18	278	
	SK-2S-Ver-6	Hydropunch	18-20	5.8	
	SK-2S-Ver-8	Hydropunch	20-22	4.1	
SK-12S	SK-12S	SAP (3 volume purge)	11- -21	84.1	
	SK-12S	RFI (Low Flow Purge)	14	29.5	
	SK-12S-2-Hydrasleeve	Hydrasleeve	14-16	34.2	
	SK-12S-4-Hydrasleeve	Hydrasleeve	16-18	33.4	
	SK-12S-6-Hydrasleeve	Hydrasleeve	18-20	31.2	
	SK-12S-Ver-2	Hydropunch	14-16	93.6	
	SK-12S-Ver-4	Hydropunch	16-18	118 E	
	SK-12S-Ver-6	Hydropunch	18-20	25.1	

Notes:

SAP, RFI and Hydrasleeve samples collected from the listed well. Hydropunch samples collected from adjacent borings
ft. bgs. - feet below ground surface (estimated)
ug/L - micrograms per liter
J - Validation Qualifier. Estimated Value
E - Laboratory Qaulifier. Estimated above instrument calibration range

TABLE 9
Soil Radiological Analytical Results
Phase IV RFI Report
Clean Harbors Kansas, LLC

DRAFT

RFI Investigation Area			Parameter:	Radium 226	Radium 228
			Method:	SW9315	SW9320
			Unit:	pCi/l	pCi/l
	Sample Location	Depth	Date		
Upgradient, Off-Site Background	BG-1	--	10/11/2013	0.58	U
	BG-2	--	10/11/2013	0.59	U
	BG-3	--	10/11/2013	0.81	U
	BG-4	--	10/11/2013	U	2.4
AOC #12	A12-1-0.5	0.5	10/9/2013	0.51	U
	A12-1-2	2	10/9/2013	0.52	U
	A12-1-5	5	10/9/2013	0.41	U
	A12-1-10	10	10/9/2013	0.91	0.89
	A12-1-15	15	10/9/2013	U	U
	A12-1-INT	17	10/9/2013	U	U
	A12-2-0.5	0.5	10/9/2013	U	0.58
	A12-2-2	2	10/9/2013	0.61	0.95
	A12-2-5	5	10/9/2013	U	U
	A12-3-0.5	0.5	10/18/2013	U	U
	A12-3-2	2	10/9/2013	U	U
	A12-3-5	5	10/9/2013	0.92	U
	A12-3-10	10	10/9/2013	0.45	0.51
	A12-3-15	15	10/9/2013	U	U
	A12-3-INT	16	10/9/2013	U	U
	A12-4-0.5	0.5	10/9/2013	0.44	0.97
	A12-4-2	2	10/9/2013	U	U
	A12-5-0.5	0.5	10/9/2013	0.69	1.5
	A12-5-2	2	10/9/2013	0.55	U
	A12-5-5	5	10/9/2013	U	U
	A12-6-0.5	0.5	10/9/2013	0.63	U
	A12-6-2	2	10/9/2013	0.46	1.2
SWMU #22	S22-1-0.5	0.5	10/9/2013	0.41	U
	S22-1-0.5	0.5	10/18/2013	U	U
	S22-2-0.5	0.5	10/9/2013	0.62	U
	S22-2-5	5	10/9/2013	1.1	U
SMWU #24	S24-1-15	15	10/10/2013	0.62	1.5
	S24-1D	38	10/15/2013	0.73	U
	S24-1D	44	10/15/2013	U	U

pCi/l = picocuries per liter

U = Not detected

Detections are shown in bold